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# Methodische und konzeptionelle Hinweise zur Entwicklung einer IVS-Rahmenarchitektur Straße für Deutschland

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Ergänzende Anlagen

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TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

Fachbereich  
Bauingenieurwesen und  
Geodäsie

Fachgebiet  
Verkehrsplanung und  
Verkehrstechnik

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## Anhang

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### A2. Anwendungsbeispiel (Ergänzungen)

#### A2.1. FRAME

Die nachfolgend dargestellten Screenshots sind im FRAME Selection Tool (FRAME 2012) gemacht worden und dokumentieren das Vorgehen im Anwendungsbeispiel.

##### A2.1.1. Functional Viewpoint

##### Schritt 1: Selection of User Needs

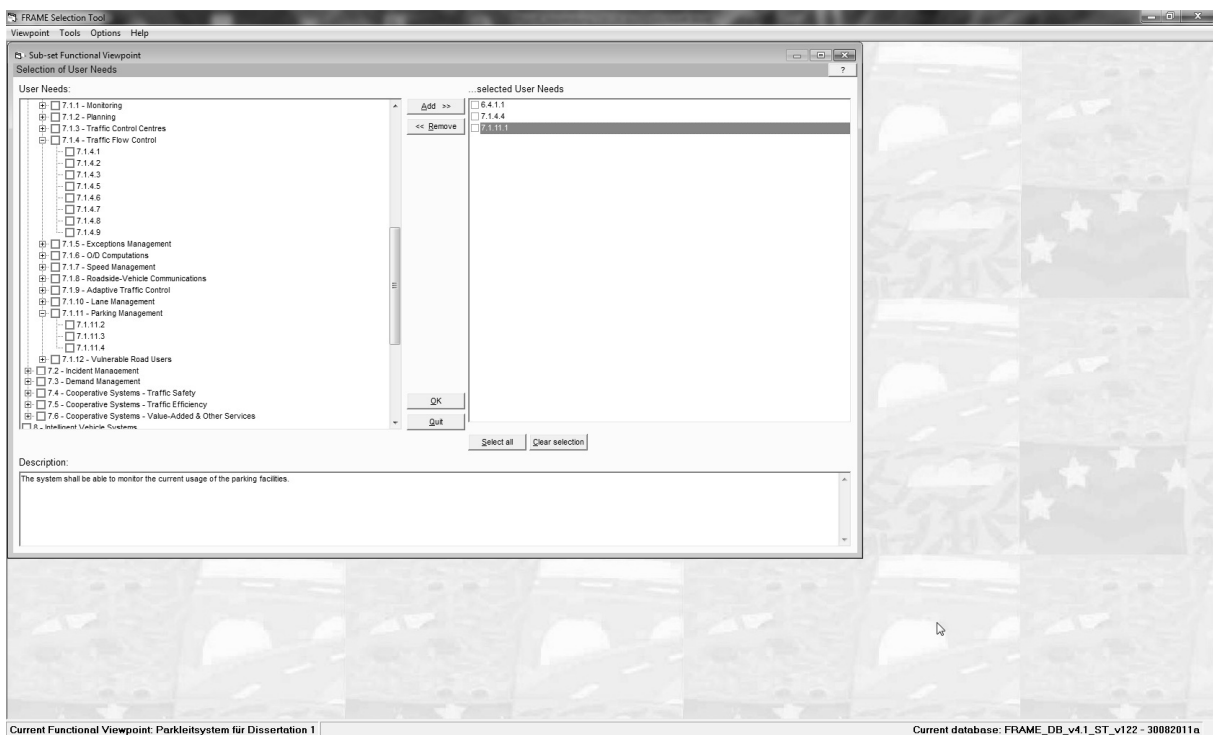


Bild 1: Selection of User Needs

## Schritt 2: Selection of low level Functions

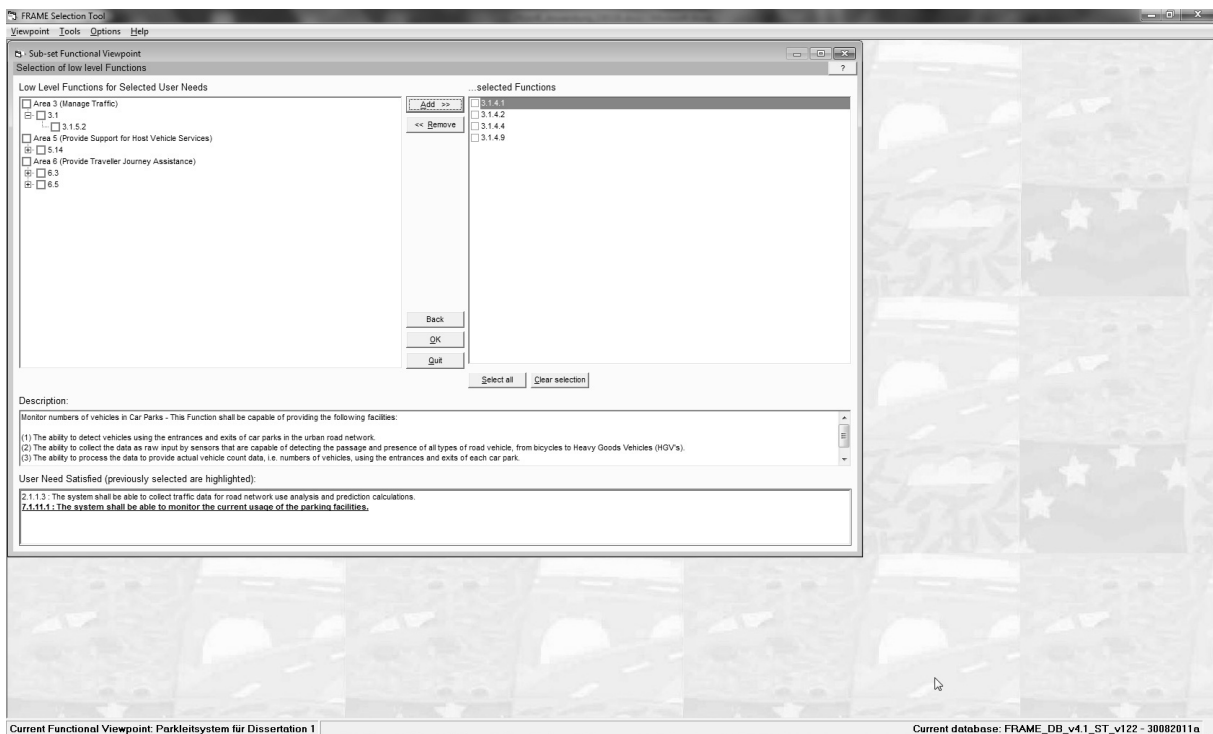


Bild 2: Selection of low level Functions

## Schritt 3: Selection of Data Flows related to selected Functions

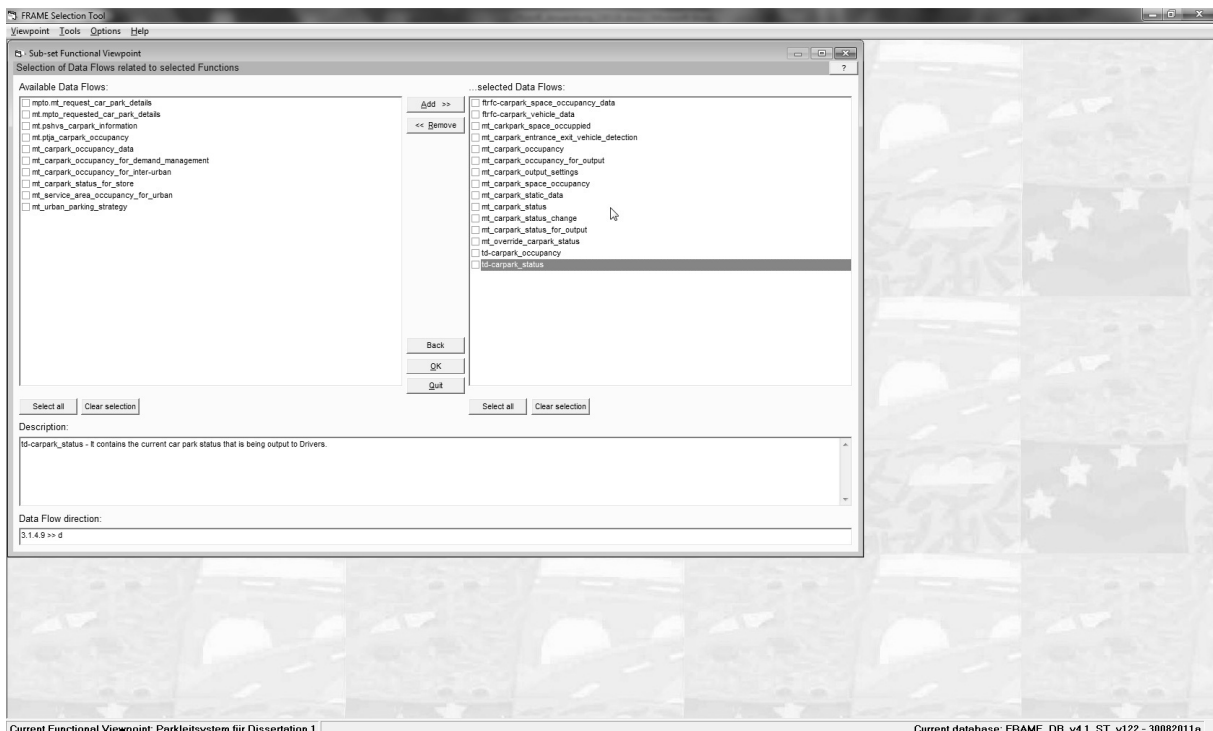


Bild 3: Selection of Data Flows related to Selected Functions



#### Schritt 4: Selection of Data Stores related to selected Data Flows

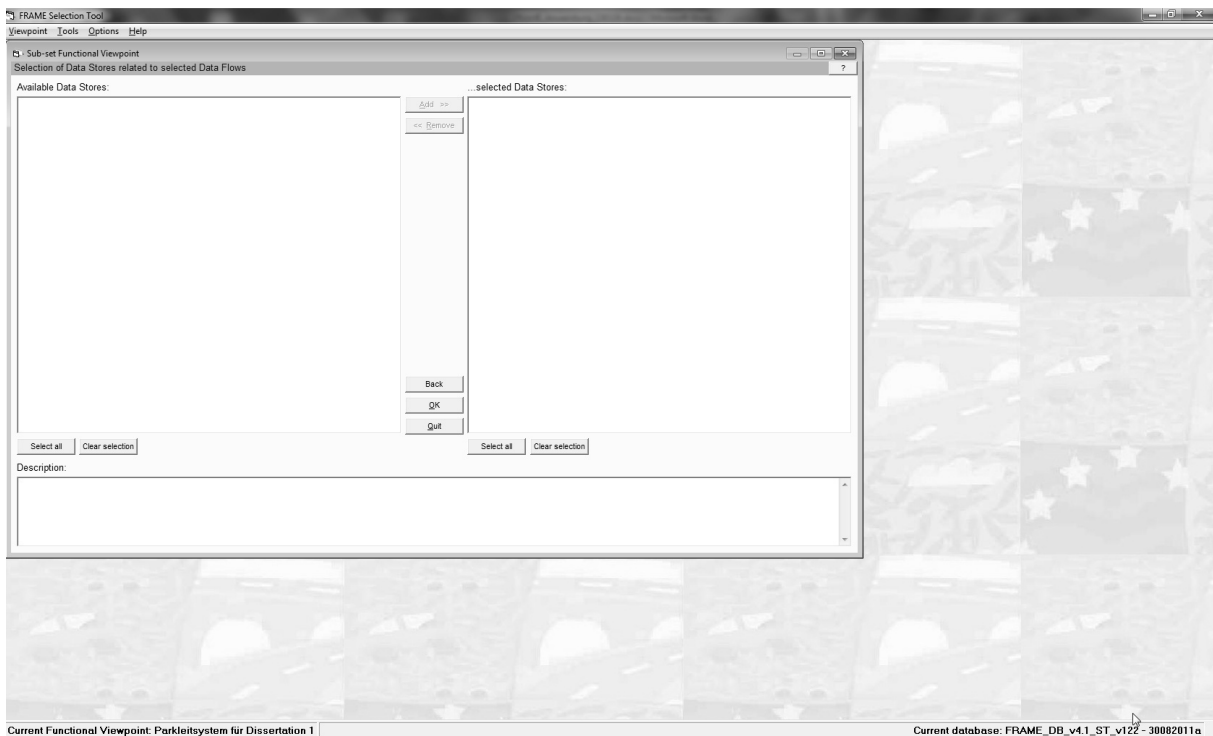


Bild 4: Selection of Data Stores related to selected Data Flows

#### Schritt 5: Selection of Data Flows related to selected Data Stores

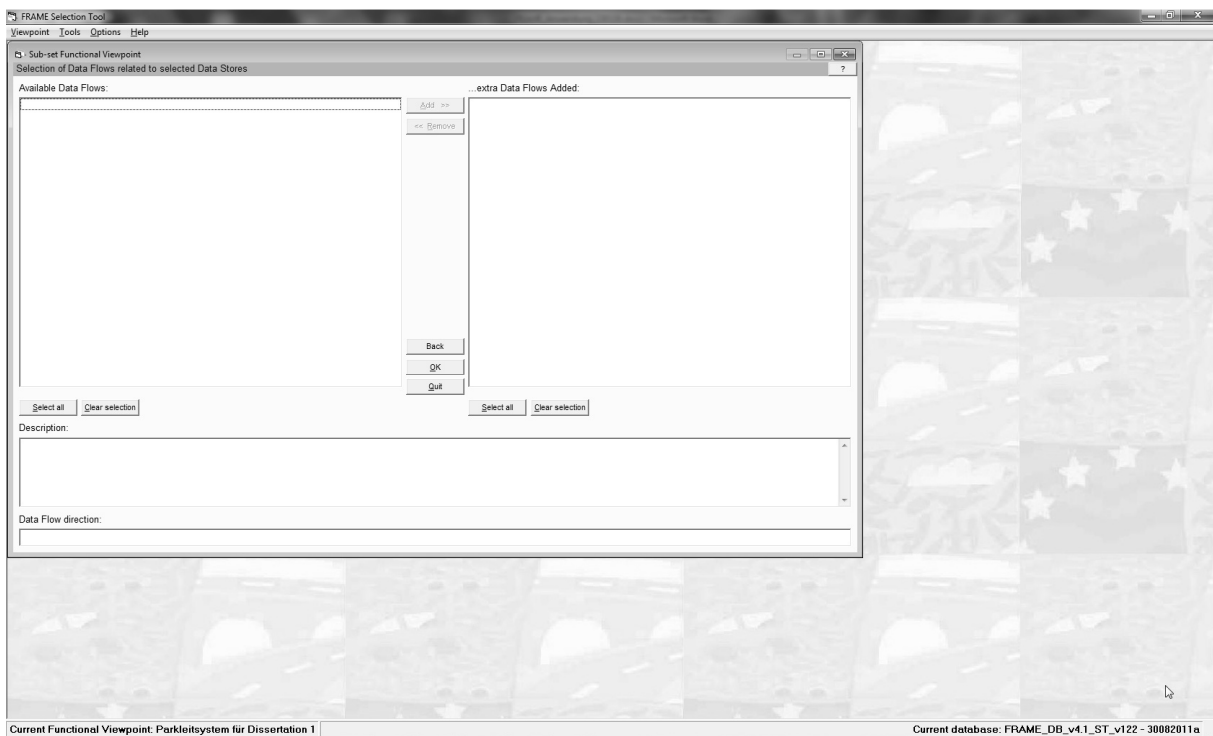


Bild 5: Selection of Data Flows related to selected Data Stores

## Schritt 6: Selection of Terminators/Actors related to selected Data Flows

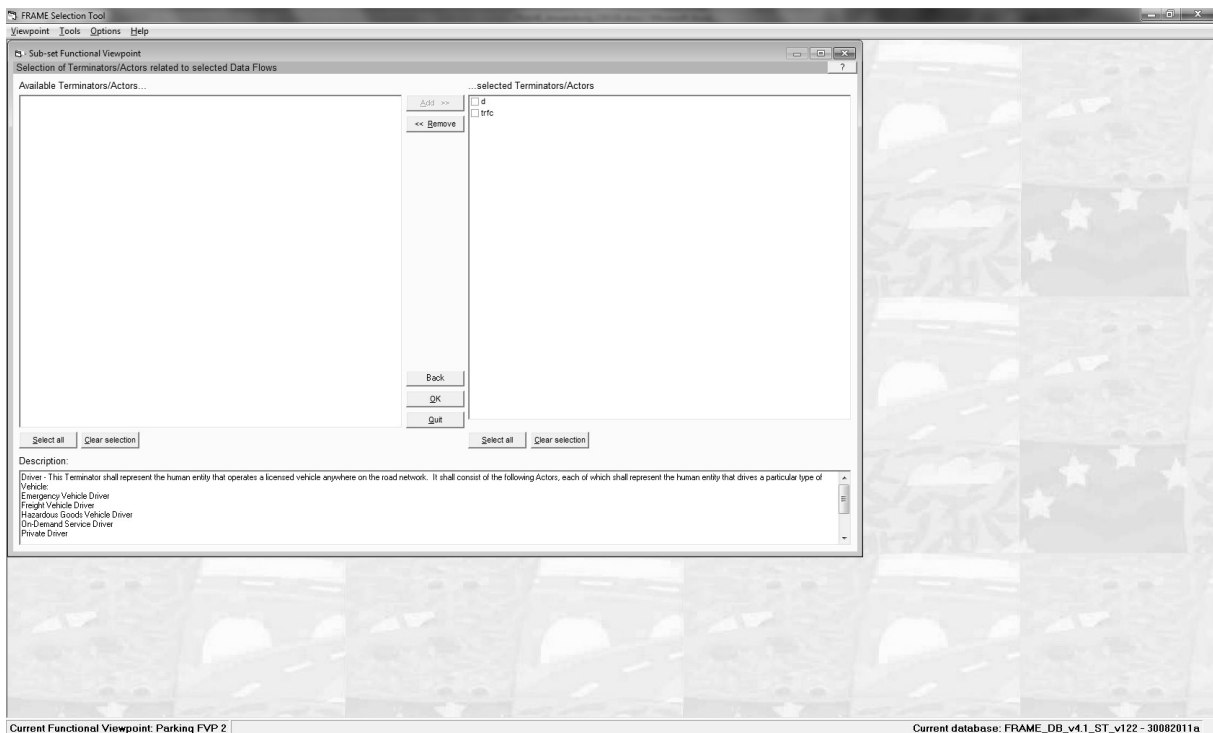


Bild 6: Selection of Terminators/Actors related to selected Data Flows

## Schritt 7: Current consistency errors and warnings

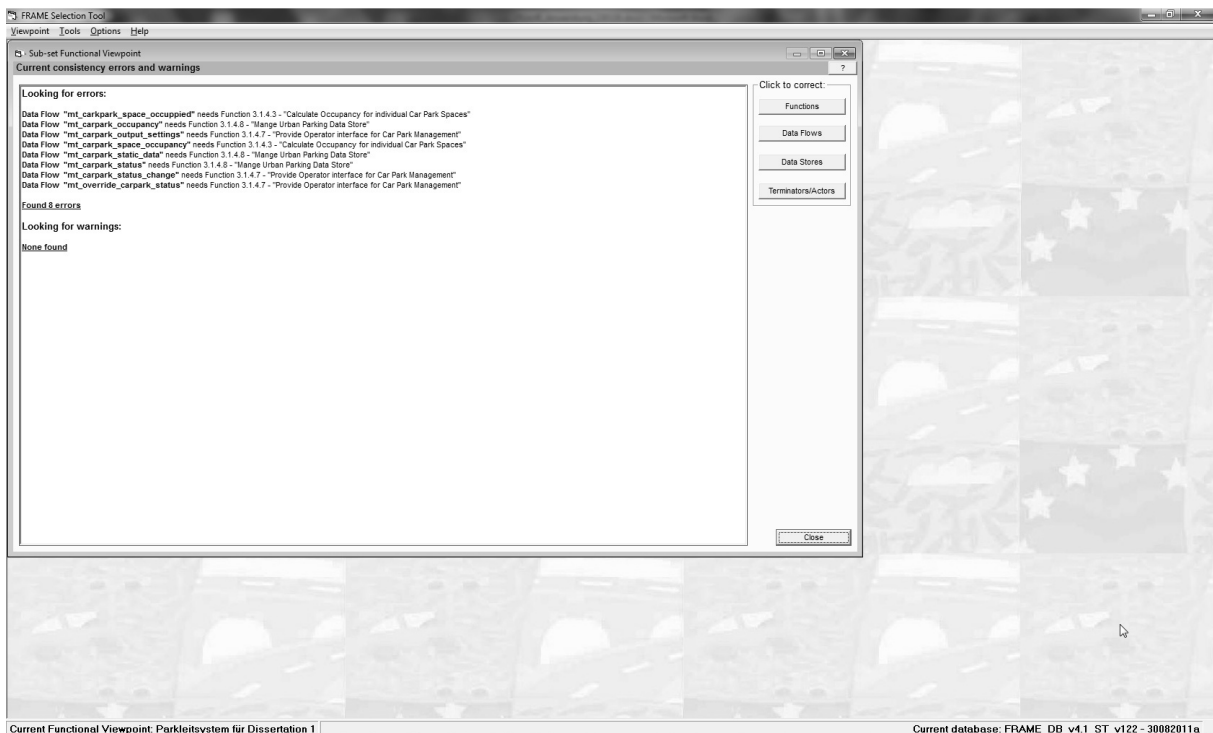


Bild 7: Current consistency errors and warnings

## Schritt 8: Selection of low level Functions



Bild 8: Selection of low level Functions

## Schritt 9: Selection of Data Flows related to selected Functions

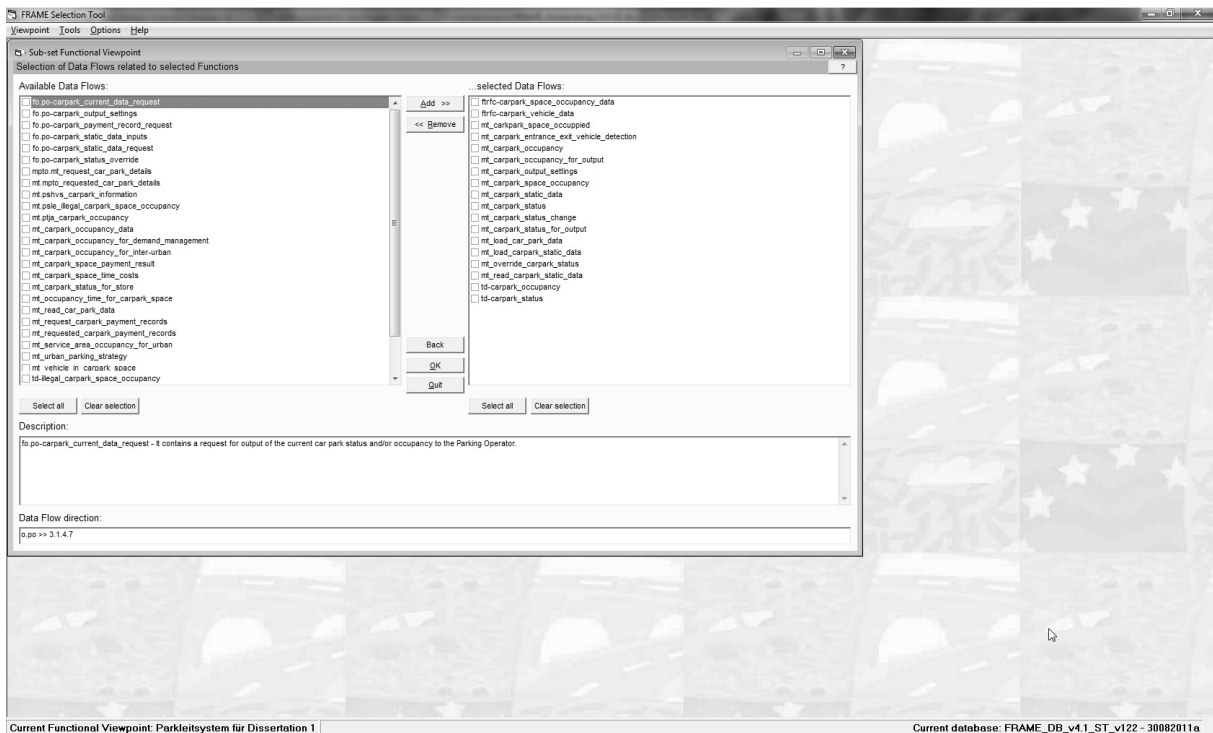


Bild 9: Selection of Data Flows related to Selected Functions

## Schritt 10: Selection of Data Stores related to selected Data Flows

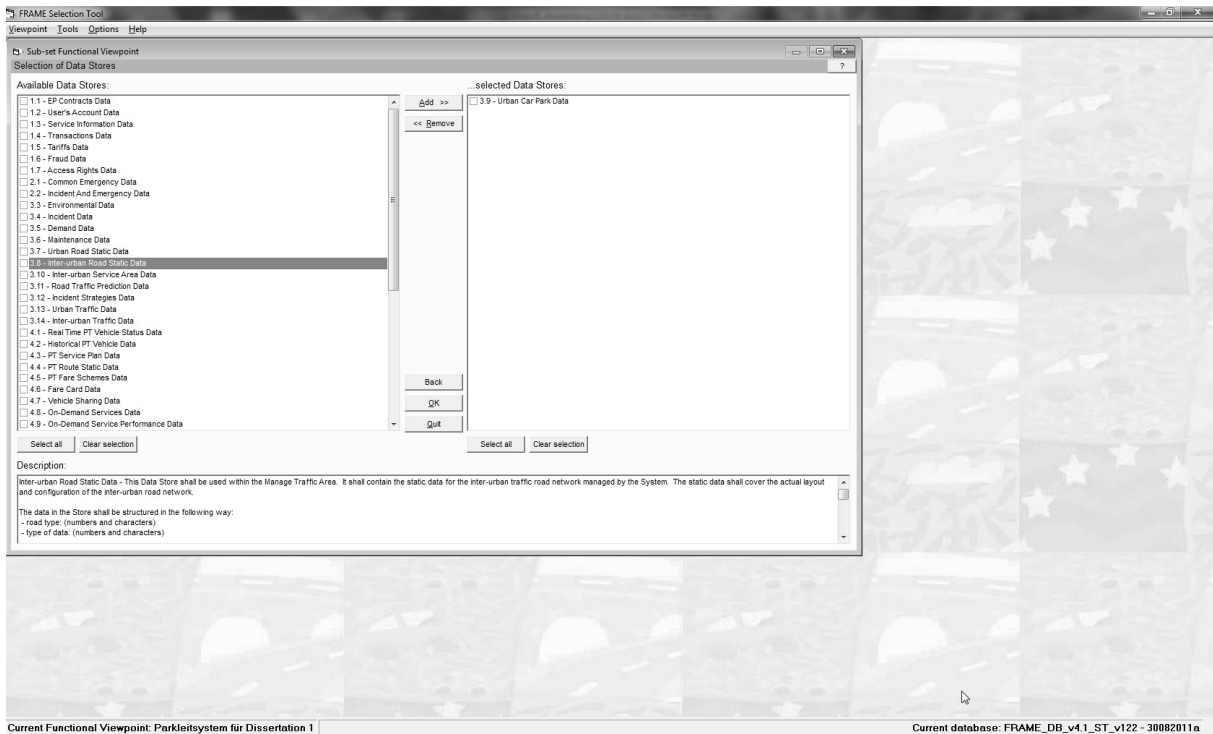


Bild 10: Selection of Data Stores related to selected Data Flows

## Schritt 11: Selection of Data Flows related to selected Data Stores

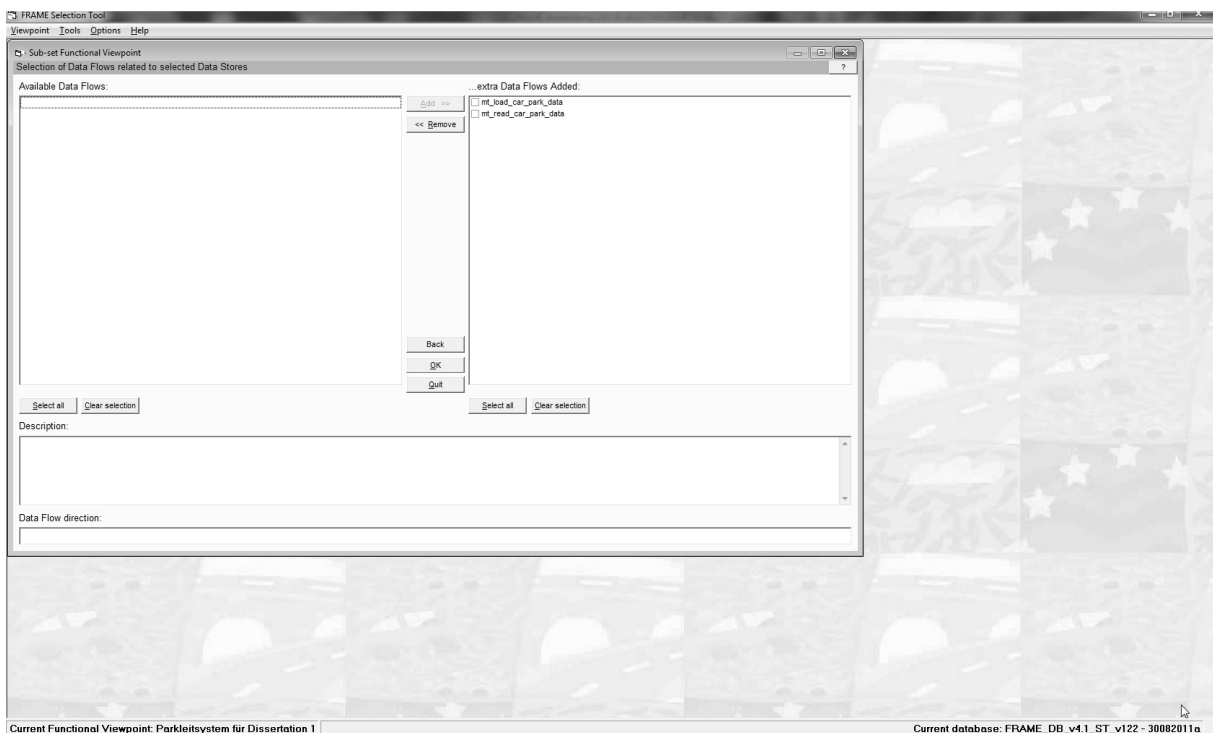


Bild 11: Selection of Data Flows related to selected Data Stores

## Schritt 12: Selection of Terminators/Actors related to selected Data Flows



Bild 12: Selection of Terminators/Actors related to selected Data Flows

## Schritt 13: Current consistency errors and warnings

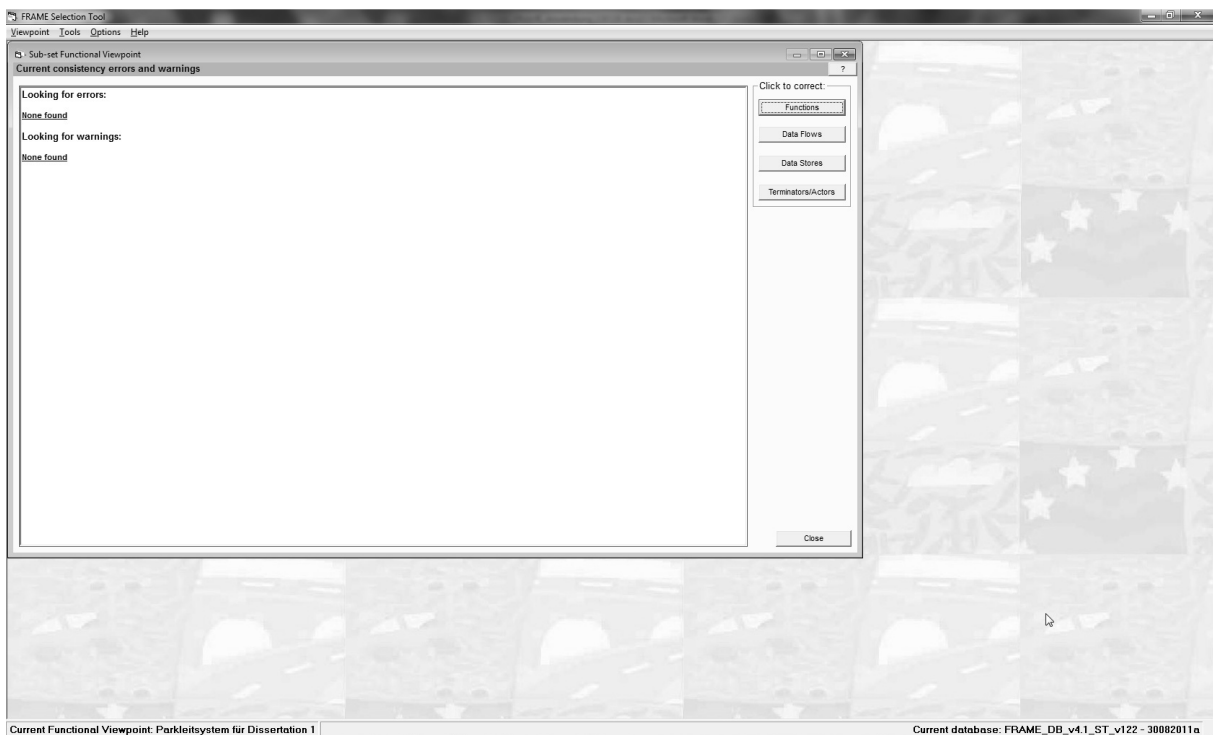


Bild 13: Current consistency errors and warnings

## A2.1.2. Physical Viewpoint

### Schritt 1: Definition of Sub-Systems

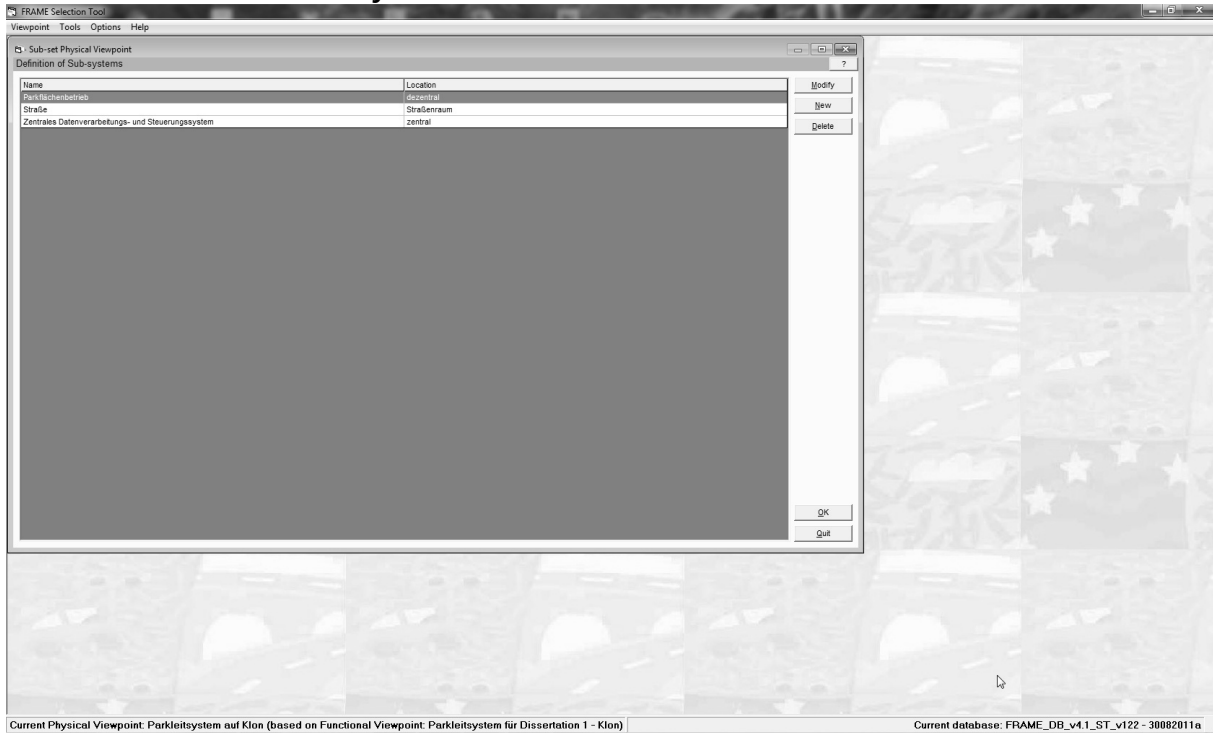


Bild 14: Definition of Sub-Systems

### Schritt 2: Allocation of Functions/Data Stores to Sub-Systems

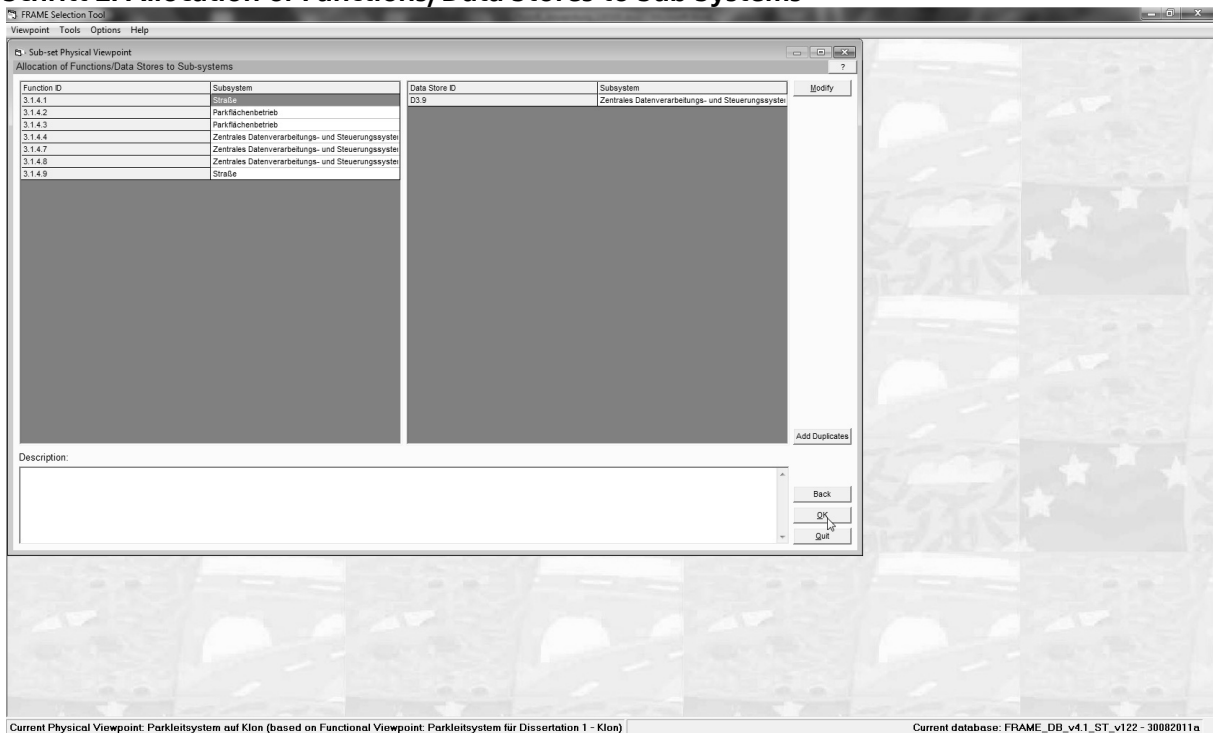


Bild 15: Allocation of Functions/Data Stores to Sub-Systems

### Schritt 3: Definition of Modules

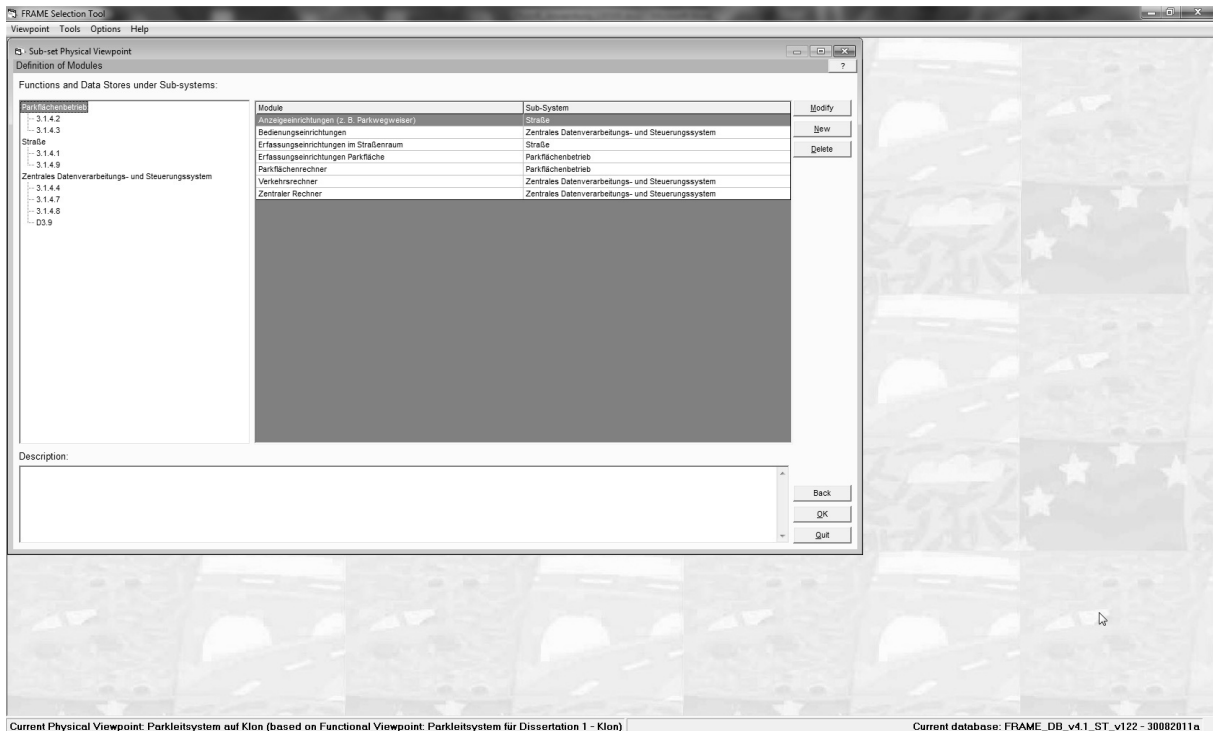


Bild 16: Definition of Modules

### Schritt 4: Allocation of Functions/Data Stores to Modules

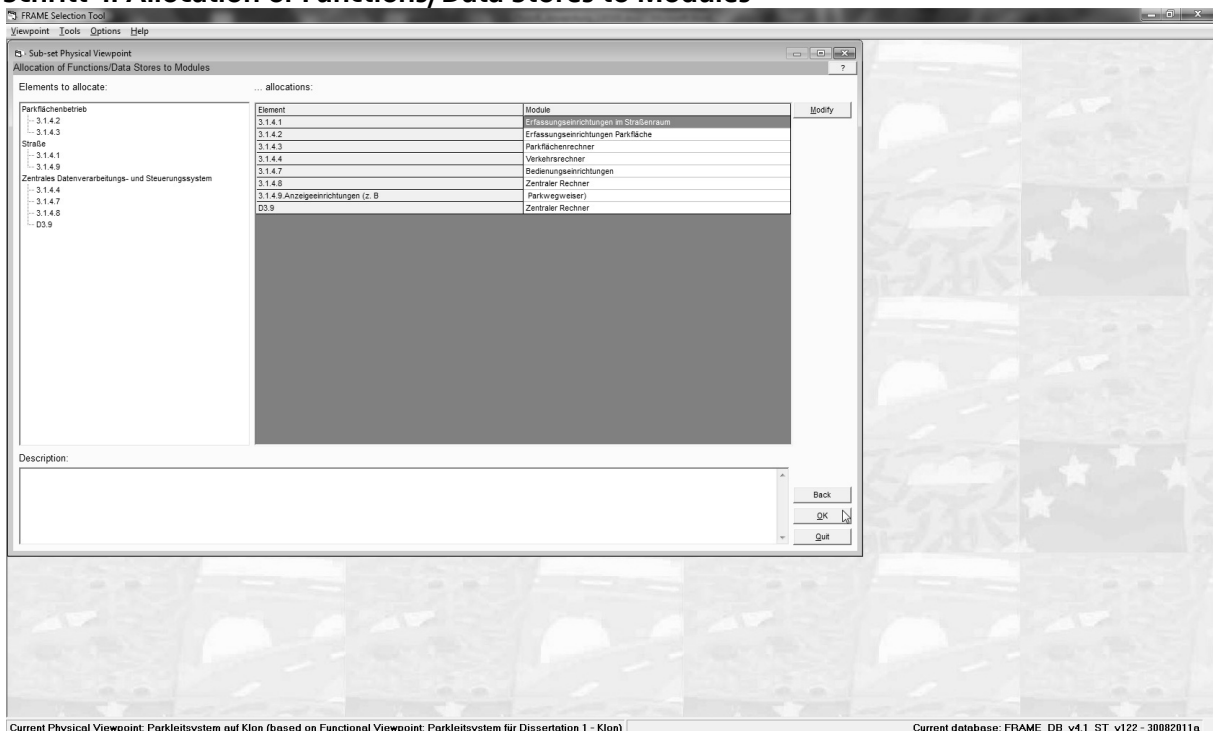


Bild 17: Allocation of Functions/Data Stores to Modules

## Schritt 5: Resulting Physical Data Flows

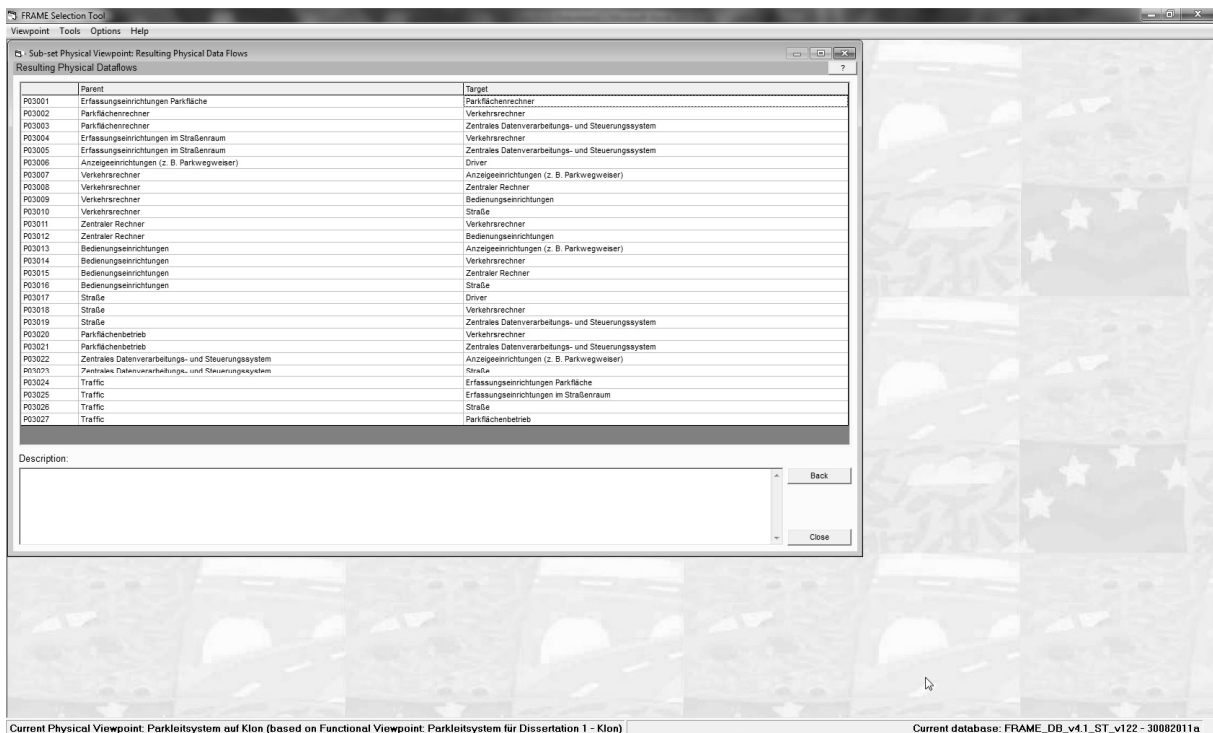


Bild 18: Resulting Physical Data Flows

## A2.1.3. Organisational Viewpoint

### Schritt 1: Definition of Organisations

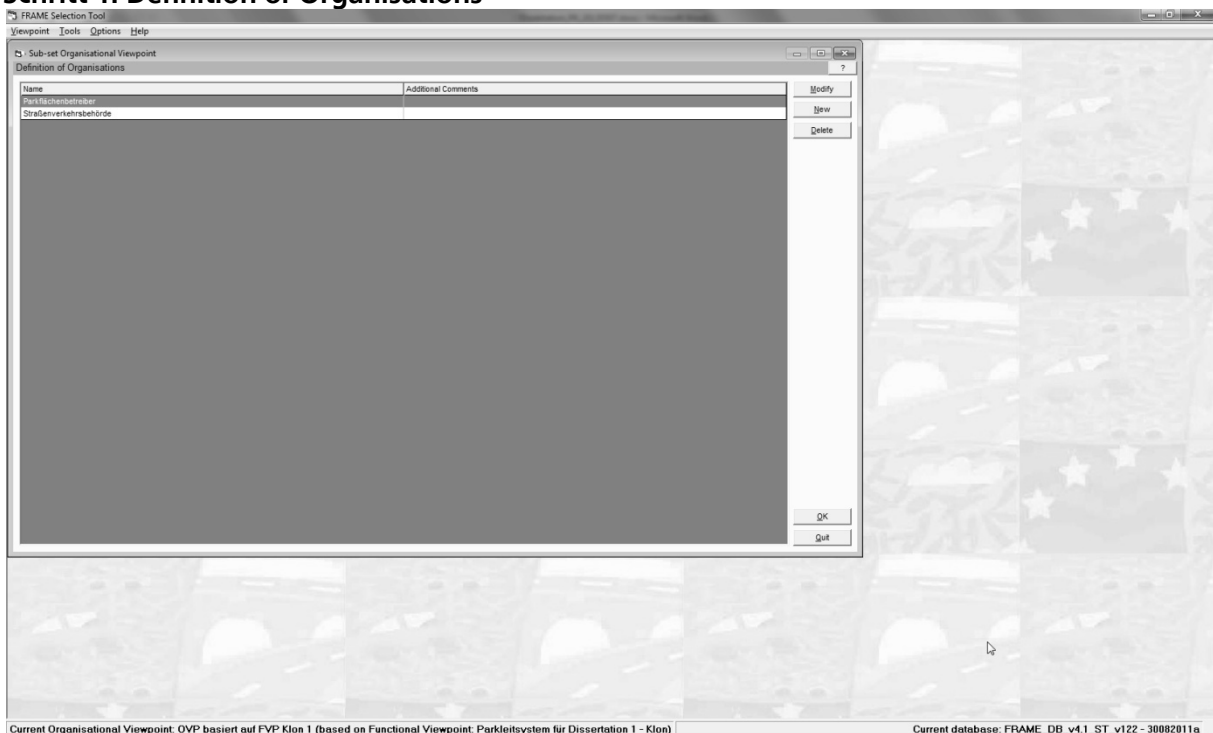


Bild 19: Definition of Organisations



## Schritt 2: Allocation of Functions/Data Stores to Organisations

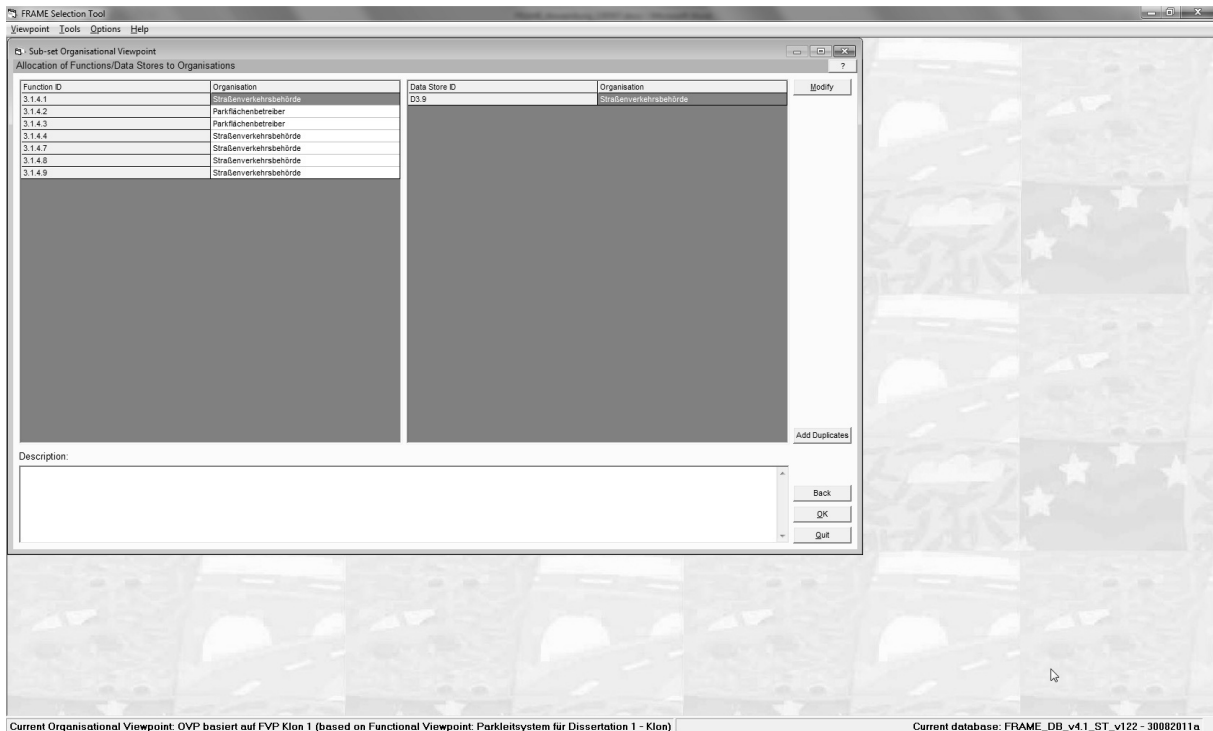


Bild 20: Allocation of Functions/Data Stores to Organisations

## Schritt 3: Resulting Organisational Data Flows

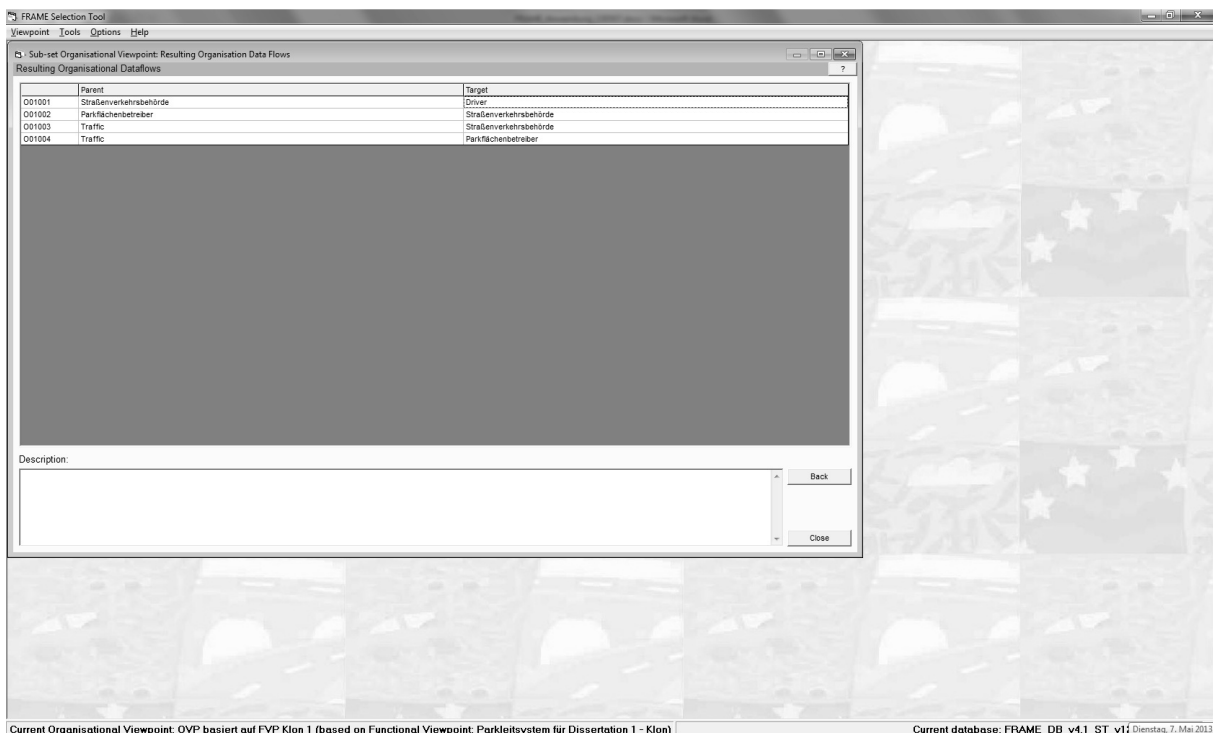


Bild 21: Resulting Organisational Data Flows

## A2.2. NITSA

Die nachfolgend dargestellten Screenshots sind in dem Programm Turbo Architecture (ITERIS 2012) gemacht worden und dokumentieren das Vorgehen im Anwendungsbeispiel.

### Start Tab

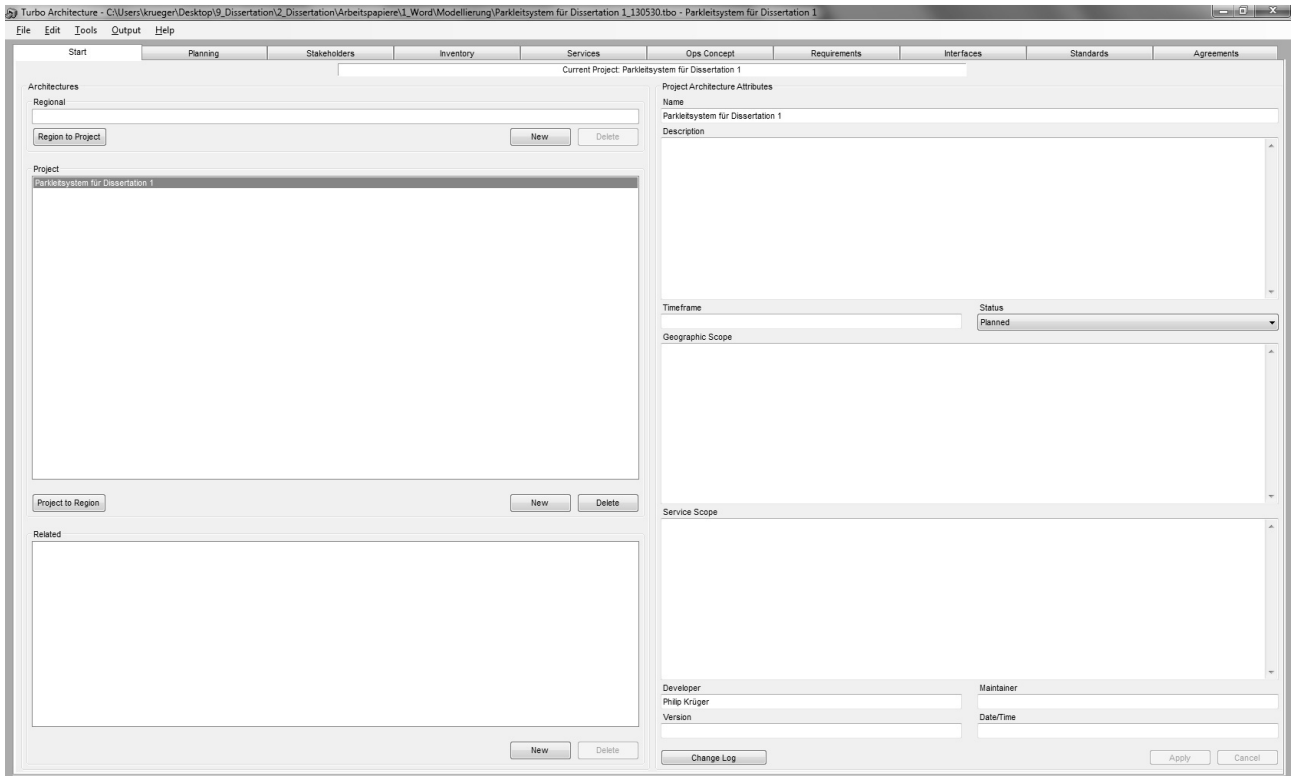


Bild 22: Start Tab

## Planning Tab

The screenshot shows the 'Planning' tab in the Turbo Architecture software. The window title is 'Turbo Architecture - C:\Users\krueger\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkletsystem für Dissertation 1\_130530.tbo - Parkletsystem für Dissertation 1'. The 'Planning' tab is selected, showing 'Objectives and Strategies' for the 'Current Project: Parkletsystem für Dissertation 1'. On the left, a list of project objectives is shown, with the first four checked: '1. Gute Orientierung insbesondere für Ortsunkundige', '2. Informationen über die Belegung von Parkflächen', '3. Reduzierung des Parksuchverkehrs und der damit verbundenen Nachteile, z. B. Lärm- und Abgasemissionen, Wartezeiten an Parkhauseinfahrten, ...', and '4. Ausgeglichene Auslastung von Parkflächen und damit höhere Wirtschaftlichkeit'. On the right, the 'Objective/Strategy Attributes' section shows a table with one entry: '1 Gute Orientierung insbesondere für Ortsunkundige'. Below this, the 'Source' section is empty. The 'Selected Performance Measures' section shows 'All Performance Measures' with an 'Add' button. The 'Selected Service Packages' section shows 'All Service Packages' with a search button and one entry: 'ATMS16: Parking Facility Management'. At the bottom, there are 'New', 'Delete', 'Apply', and 'Cancel' buttons.

Bild 23: Planning Tab

## Stakeholders Tab

The screenshot shows the 'Stakeholders' tab in the Turbo Architecture software. The window title is 'Turbo Architecture - C:\Users\krueger\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkletsystem für Dissertation 1\_130530.tbo - Parkletsystem für Dissertation 1'. The 'Stakeholders' tab is selected, showing 'Stakeholders' for the 'Current Project: Parkletsystem für Dissertation 1'. On the left, a list of project stakeholders is shown, with the first two checked: 'Parkhausbetreiber' and 'Straßenverkehrsbehörde'. On the right, the 'Stakeholder Attributes' section shows a table with one entry: 'Parkhausbetreiber'. Below this, the 'Associated Stakeholders' section shows 'All Stakeholders' with a search button and one entry: 'Straßenverkehrsbehörde'. At the bottom, there are 'New', 'Delete', 'Apply', and 'Cancel' buttons.

Bild 24: Stakeholders Tab

## Inventory Tab

Turbo Architecture - C:\Users\krueger\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkleitsystem für Dissertation 1\_130530.tbo - Parkleitsystem für Dissertation 1

File Edit Tools Output Help

Start Planning Stakeholders **Inventory** Services Ops Concept Requirements Interfaces Standards Agreements

Current Project: Parkleitsystem für Dissertation 1

Elements

Project Elements All Elements

- ☒ Bedienungsrichtungen
- ☒ Erfassungseinrichtungen im Straßenraum
- ☒ Erfassungseinrichtungen in der Parkfläche
- ☒ Fahrer
- ☒ Fahrzeugigenschaften
- ☒ Parkflächenrechner
- ☒ Parkwegweiser
- ☒ Verkehrsrechner
- ☒ Zentraler Rechner

Sort By: ☒ Element ☐ Stakeholder ☐ Subsystem/Terminator

New Delete

Element Attributes

Name: Zentraler Rechner

Type: Normal

Stakeholder: Status (Current Project) Planned

Description:

Selected Subsystems/Terminators All Subsystems/Terminators

- ☒ Traffic Management (Subsystem)
- ☐ Archived Data Management (Subsystem)
- ☐ Commercial Vehicle (Subsystem)
- ☐ Commercial Vehicle Administration (Subsystem)
- ☐ Commercial Vehicle Check (Subsystem)
- ☐ Emergency Management (Subsystem)
- ☐ Emergency Vehicle (Subsystem)
- ☐ Emissions Management (Subsystem)
- ☐ Fleet and Freight Management (Subsystem)
- ☐ Information Service Provider (Subsystem)
- ☐ Maintenance and Construction Management (Subsystem)
- ☐ Maintenance and Construction Vehicle (Subsystem)
- ☐ Parking Management (Subsystem)
- ☐ Payment Administration (Subsystem)
- ☐ Personal Information Access (Subsystem)
- ☐ Remote Traveler Support (Subsystem)
- ☐ Roadway (Subsystem)
- ☐ Roadway Payment (Subsystem)
- ☐ Security Monitoring (Subsystem)
- ☐ Transit Management (Subsystem)
- ☐ Transit Vehicle (Subsystem)
- ☐ Vehicle (Subsystem)
- ☐ Alerting and Advisory Systems (Terminator)
- ☐ Archived Data Administrator (Terminator)
- ☐ Archived Data User Systems (Terminator)
- ☐ Asset Management (Terminator)
- ☐ Basic Commercial Vehicle (Terminator)
- ☐ Basic Maintenance and Construction Vehicle (Terminator)
- ☐ Basic Transit Vehicle (Terminator)
- ☐ Basic Vehicle (Terminator)
- ☐ Border Inspection Administration (Terminator)
- ☐ Border Inspection Systems (Terminator)
- ☐ Care Facility (Terminator)
- ☐ Commercial Vehicle Driver (Terminator)

Apply Cancel

Bild 25: Inventory Tab

## Services Tab

Turbo Architecture - C:\Users\krueger\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkleitsystem für Dissertation 1\_130530.tbo - Parkleitsystem für Dissertation 1

File Edit Tools Output Help

Start Planning Stakeholders Inventory **Services** Ops Concept Requirements Interfaces Standards Agreements

Current Project: Parkleitsystem für Dissertation 1

Service Packages

Project Service Packages All Service Packages

- ☒ ATMS06: Traffic Information Dissemination
- ☒ ATMS16: Parking Facility Management

Autoselect Search

Service Package Attributes

ID: ATMS16 Status (Current Project) Planned

Name:

Parking Facility Management

Description:

This service package provides enhanced monitoring and management of parking facilities. It assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees. This service package collects current parking status, shares this data with Information Service Providers and Traffic Management, and collects parking fees using the same in-vehicle equipment utilized for electronic toll collection or contact or proximity traveler cards used for electronic payment. Two other service packages, APTSM: Transit Fare Collection Management and ATMS10: Electronic Toll Collection also provide electronic payment services. These three service packages in combination provide an integrated electronic payment system for transportation services.

Selected Elements Project Elements All Elements

- ☒ Erfassungseinrichtungen in der Parkfläche
- ☒ Fahrzeugigenschaften
- ☒ Parkflächenrechner
- ☐ Bedienungsrichtungen
- ☐ Fahrer
- ☐ Verkehrsrechner
- ☐ Zentraler Rechner

Regional ITS Architecture Information

Regional ITS Architecture not available Status (Region) None

Comment:

New Delete

Apply Cancel

Bild 26: Services Tab

## Ops Concept Tab

Turbo Architecture - C:\Users\krueger\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkleitsystem für Dissertation 1\_130530.tbo - Parkleitsystem für Dissertation 1

File Edit Tools Output Help

Start Planning Stakeholders Inventory Services Ops Concept Requirements Interfaces Standards Agreements

Current Project: Parkleitsystem für Dissertation 1

Role and Responsibility Areas

Project Areas | All Areas | Autoselect

- ☒ Betrieb der Parkflächen
- ☒ Zentrales Verkehrsmanagement

Role and Responsibility Area Attributes

Name: Betrieb der Parkflächen

Description: Datenerfassung Parkfläche, Berechnung Stellplatzbelegung, Weitergabe der Daten an das zentrale Verkehrsmanagement

Selected Service Packages | All Service Packages |

- ☒ ATMS16: Parking Facility Management

Selected Stakeholders | Related Stakeholders | All Stakeholders |

- ☒ Parkhausbetreiber

New Delete Apply Cancel

Bild 27: Ops Concept Tab

## Requirements Tab

Turbo Architecture - C:\Users\krueger\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkleitsystem für Dissertation 1\_130530.tbo - Parkleitsystem für Dissertation 1

File Edit Tools Output Help

Start Planning Stakeholders Inventory Services Ops Concept Requirements Interfaces Standards Agreements

Current Project: Parkleitsystem für Dissertation 1

Project Elements

Elements | Functional Areas

- ☒ Bedienungs-einrichtungen
- ☒ Erfassungseinrichtungen im Straßenraum
- ☒ Erfassungseinrichtungen in der Parkfläche
- ☐ Fahrer
- ☐ Fahrzeugeigenschaften
- ☒ Parkflächenrechner
- ☒ Parkwegweiser
- ☒ Verkehrsrechner
- ☒ Zentraler Rechner

Functionality

☒ Specify Functionality

Selected Functional Areas | Related Functional Areas |

☒ Autoselect ☒ Requirements

- ☒ TMC Work Zone Traffic Management

Entity: Type: Apply Cancel

Bild 28: Requirements Tab

## Interfaces Tab

Turbo Architecture - C:\Users\kruege\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkleitsystem für Dissertation 1\_130530.tbo - Parkleitsystem für Dissertation 1

File Edit Tools Output Help

Start Planning Stakeholders Inventory Services Ops Concept Requirements Interfaces Standards Agreements

All Build Connect Flows Group Sort Filter Elements Limit New Info Present

**Parkleitsystem für Dissertation 1: All Architecture Flows (28 Entries)**

Source Element	Flow Name	Destination Element	In Region	Status	Include
Bedienungseinrichtungen	roadway information system data	Erfassungseinrichtungen im Straßenraum	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Bedienungseinrichtungen	parking lot inputs	Erfassungseinrichtungen in der Parkfläche	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Bedienungseinrichtungen	parking lot inputs	Parkflächenrechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Bedienungseinrichtungen	roadway information system data	Parkwegweiser	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Erfassungseinrichtungen im Straßenraum	roadway information system status	Bedienungseinrichtungen	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Erfassungseinrichtungen im Straßenraum	driver information	Fahrer	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Erfassungseinrichtungen im Straßenraum	roadway equipment coordination	Parkwegweiser	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Erfassungseinrichtungen im Straßenraum	roadway information system status	Verkehrrechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Erfassungseinrichtungen im Straßenraum	roadway information system status	Zentraler Rechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Erfassungseinrichtungen in der Parkfläche	driver parking information	Fahrer	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Erfassungseinrichtungen in der Parkfläche	roadside transaction status	Fahrer	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Fahrzeugeigenschaften	vehicle characteristics	Erfassungseinrichtungen in der Parkfläche	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Fahrzeugeigenschaften	vehicle characteristics	Parkflächenrechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Parkflächenrechner	driver parking information	Fahrer	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Parkflächenrechner	roadside transaction status	Fahrer	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Parkwegweiser	roadway information system status	Bedienungseinrichtungen	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Parkwegweiser	roadway equipment coordination	Erfassungseinrichtungen im Straßenraum	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Parkwegweiser	driver information	Fahrer	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Parkwegweiser	roadway information system status	Verkehrrechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Parkwegweiser	roadway information system status	Zentraler Rechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Verkehrrechner	roadway information system data	Erfassungseinrichtungen im Straßenraum	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Verkehrrechner	parking lot inputs	Erfassungseinrichtungen in der Parkfläche	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Verkehrrechner	parking lot inputs	Parkflächenrechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Verkehrrechner	roadway information system data	Parkwegweiser	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Zentraler Rechner	roadway information system data	Erfassungseinrichtungen im Straßenraum	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Zentraler Rechner	parking lot inputs	Erfassungseinrichtungen in der Parkfläche	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Zentraler Rechner	parking lot inputs	Parkflächenrechner	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>
Zentraler Rechner	roadway information system data	Parkwegweiser	<input checked="" type="checkbox"/>	Planned	<input checked="" type="checkbox"/>

Include All Clear All Apply Cancel

Bild 29: Interfaces Tab

## Standards Tab

Turbo Architecture - C:\Users\kruege\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkleitsystem für Dissertation 1\_130530.tbo - Parkleitsystem für Dissertation 1

File Edit Tools Output Help

Start Planning Stakeholders Inventory Services Ops Concept Requirements Interfaces Standards Agreements

Current Architecture Standards View Group Sort Filter Limit Info Present

**Parkleitsystem für Dissertation 1 Standards (8 Entries)**

Group	Group/Doc ID	Title	SDO	User Defined	Include
<input checked="" type="checkbox"/>	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	SAE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	NTCP C2C	NTCP Center-to-Center Standards Group	AASHTO/ITENEMA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	NTCP C2F	NTCP Center-to-Field Standards Group	AASHTO/ITENEMA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	NTCP 1201	Global Object Definitions	AASHTO/ITENEMA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	NTCP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	AASHTO/ITENEMA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	NTCP 1203	Object Definitions for Dynamic Message Signs (DMS)	AASHTO/ITENEMA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	NTCP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	AASHTO/ITENEMA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	NTCP 1214	Object Definitions for Conflict Monitor Units (CMU)	AASHTO/ITENEMA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

New Copy Modify Delete Apply Cancel

Bild 30: Standards Tab

## Agreements Tab

Turbo Architecture - C:\Users\krueger\Desktop\9\_Dissertation2\_Dissertation\Arbeitspapiere\1\_Word\Modellierung\Parkleitsystem für Dissertation\_1\_130530.tbo - Parkleitsystem für Dissertation 1

File Edit Tools Output Help

Start Planning Stakeholders Inventory Services Ops Concept Requirements Interfaces Standards Agreements

Current Project: Parkleitsystem für Dissertation 1

Agreements

Project Agreements | All Agreements

Number	Title
<input checked="" type="checkbox"/> 1	Datenüberlassungsvereinbarung

Visible Columns: ☐ Number ☐ Title ☒ Both

New Delete

Agreement Attributes

Title  
Datenüberlassungsvereinbarung

Number  
1

Status  
Planned

Type

Description

Lead Stakeholder  
Straßenverkehrsbehörde

Selected Stakeholders | All Stakeholders

<input checked="" type="checkbox"/> Parkhausbetreiber
<input checked="" type="checkbox"/> Straßenverkehrsbehörde

Apply Cancel

Bild 31: Agreements Tab





## Use Case: Transportation Network Utilisation

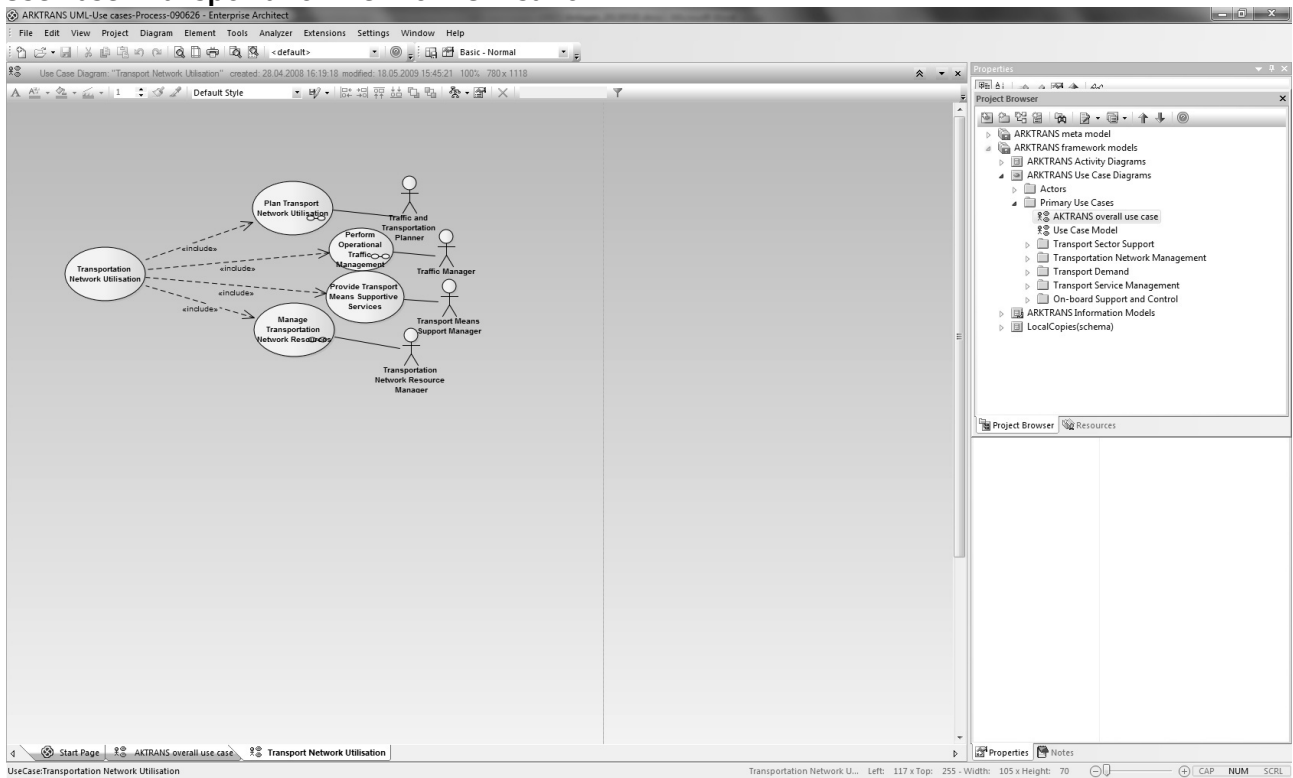


Bild 33: Use Case: Transportation Network Utilisation

## Use Case: Transportation Network Resource Management

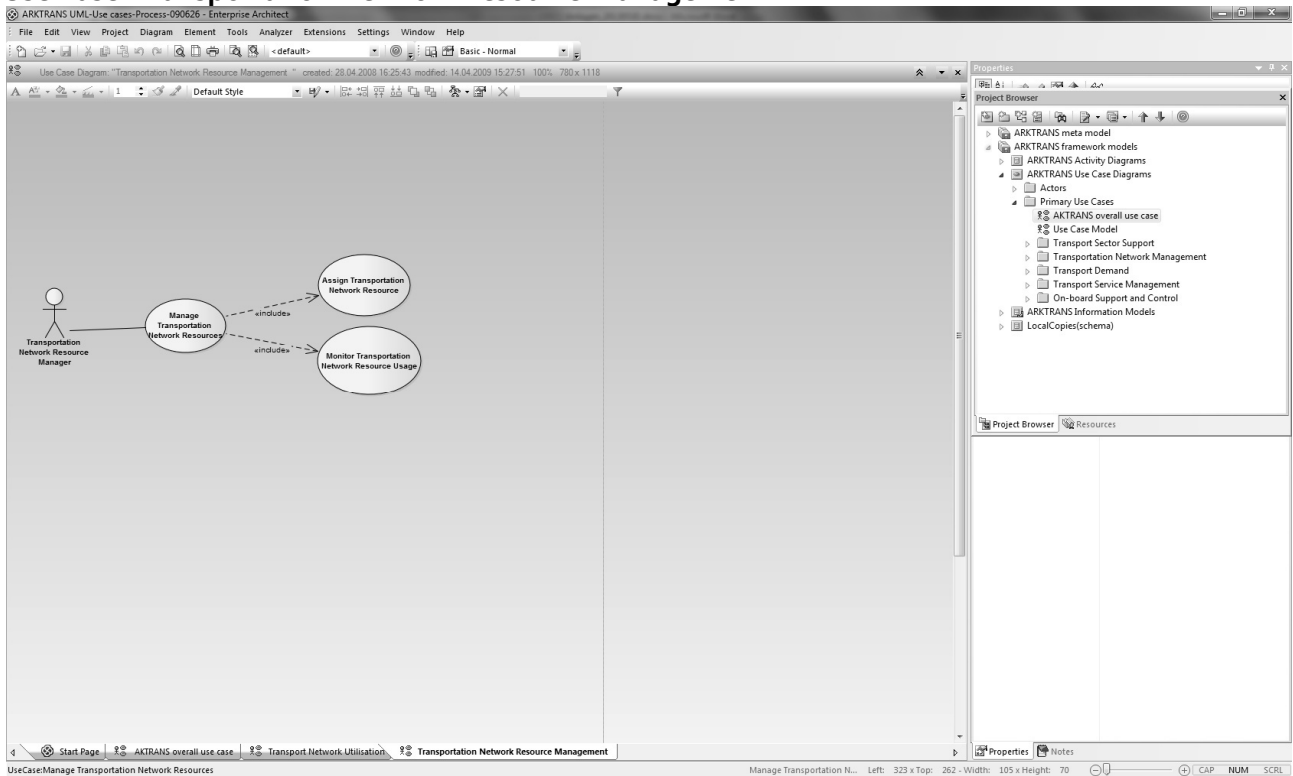


Bild 34: Use Case: Transportation Network Resource Management

## Use Case: Perform Operational Traffic Management

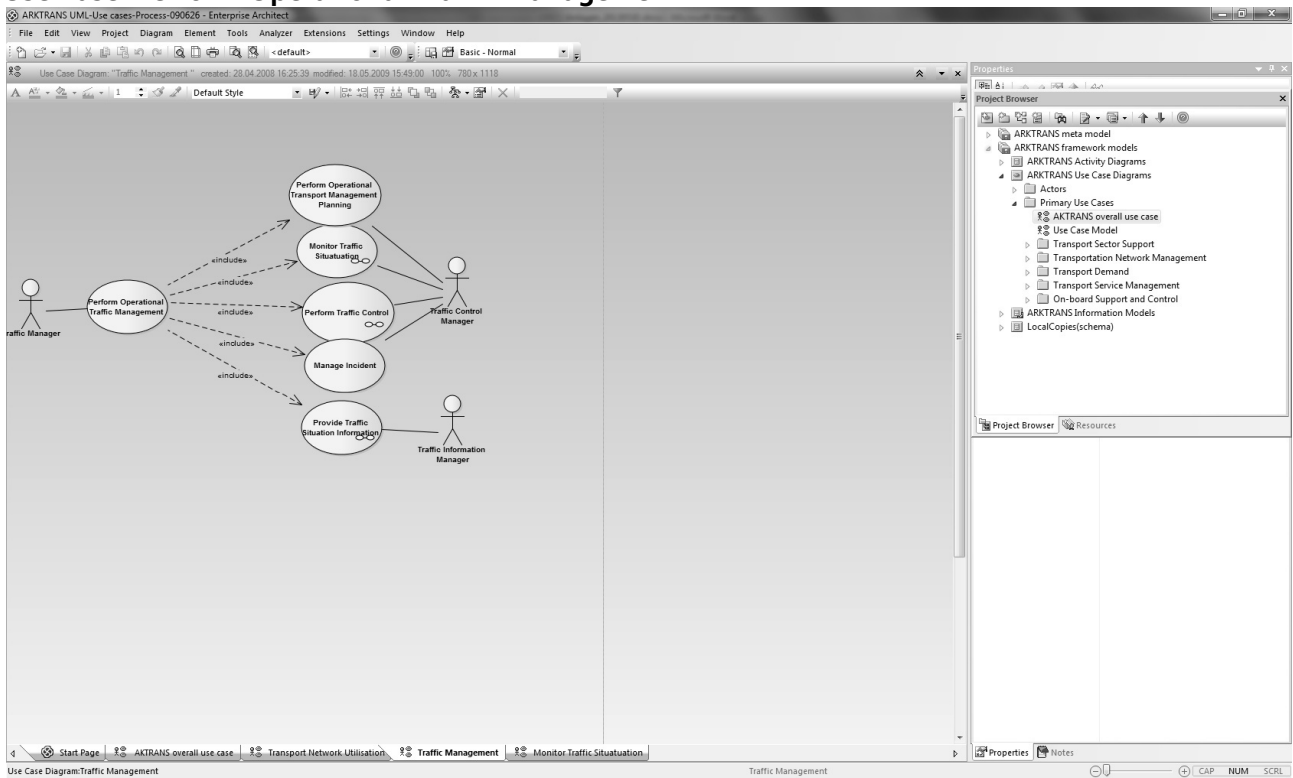


Bild 35: Use Case: Perform Operational Traffic Management

## Use Case: Monitor Traffic Situation

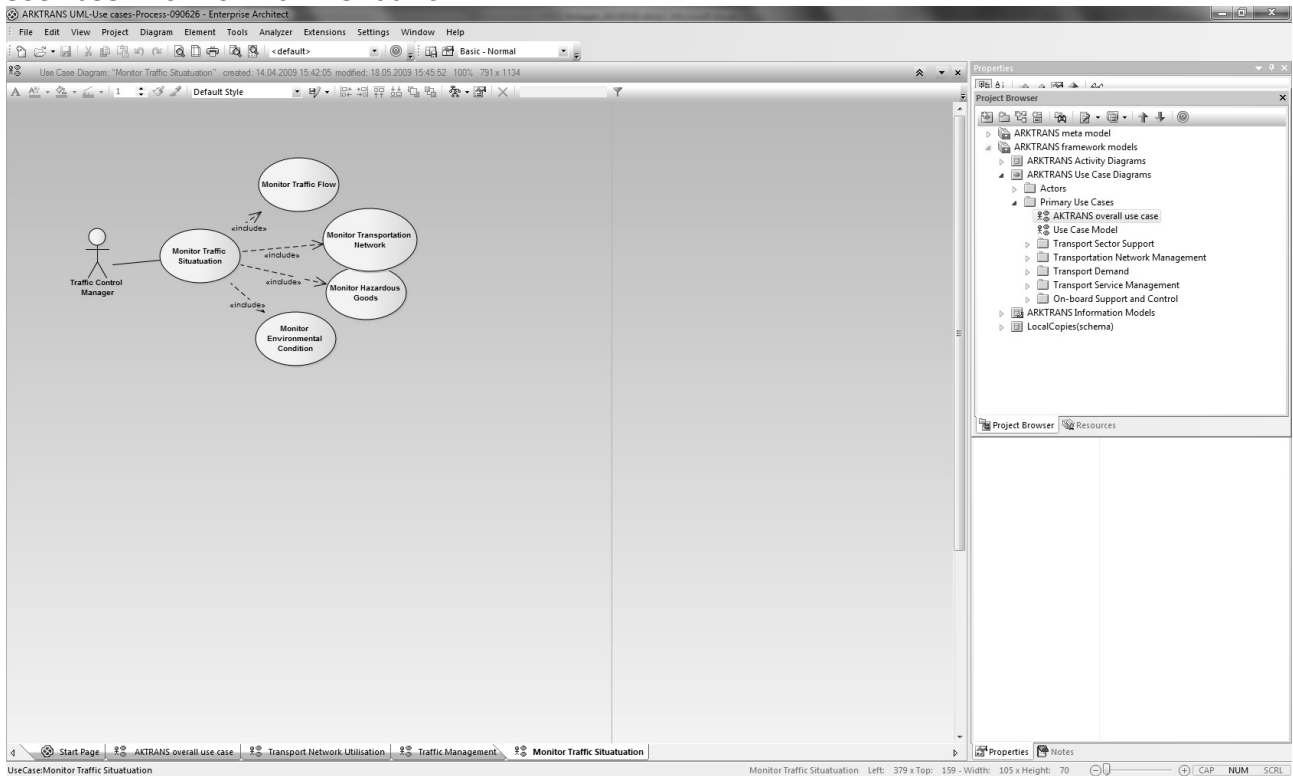


Bild 36: Use Case: Monitor Traffic Situation

## Use Case: Provide Traffic Situation Information

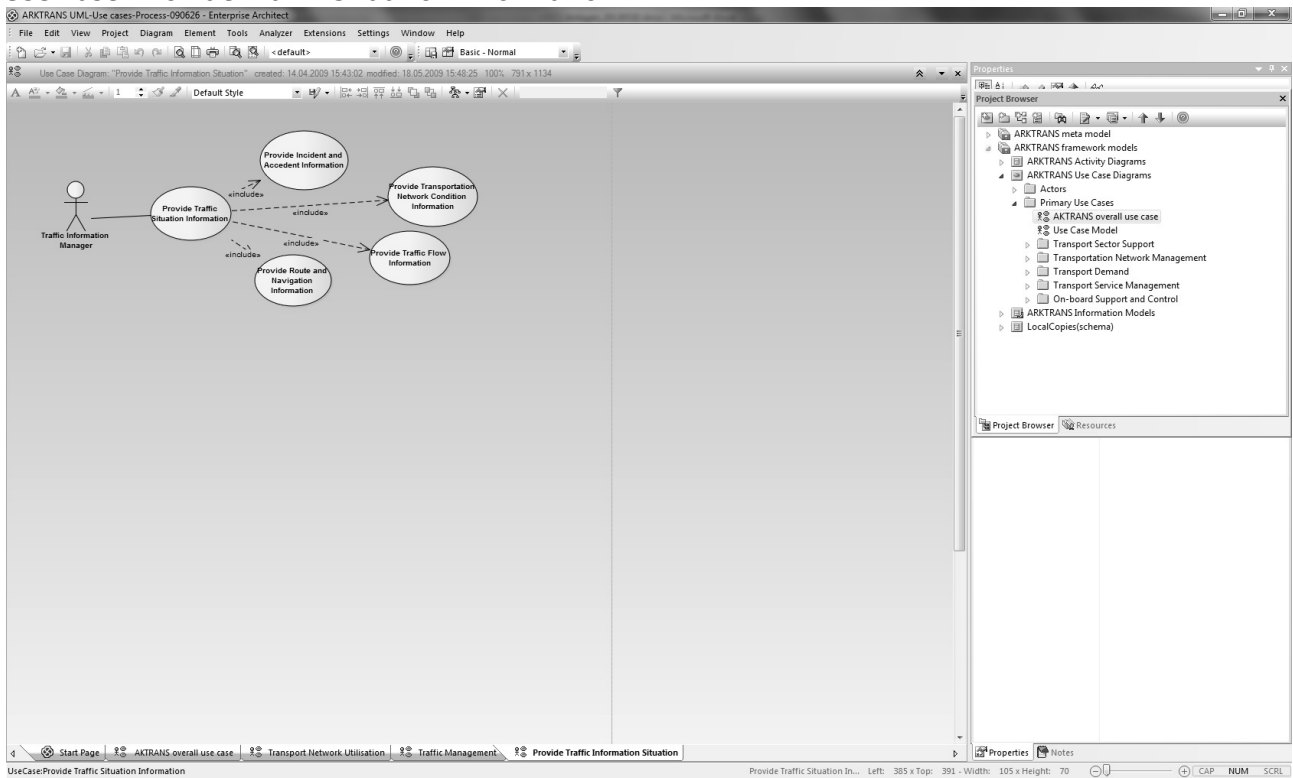


Bild 37: Use Case: Provide Traffic Situation Information

## Use Case: Perform Traffic Control

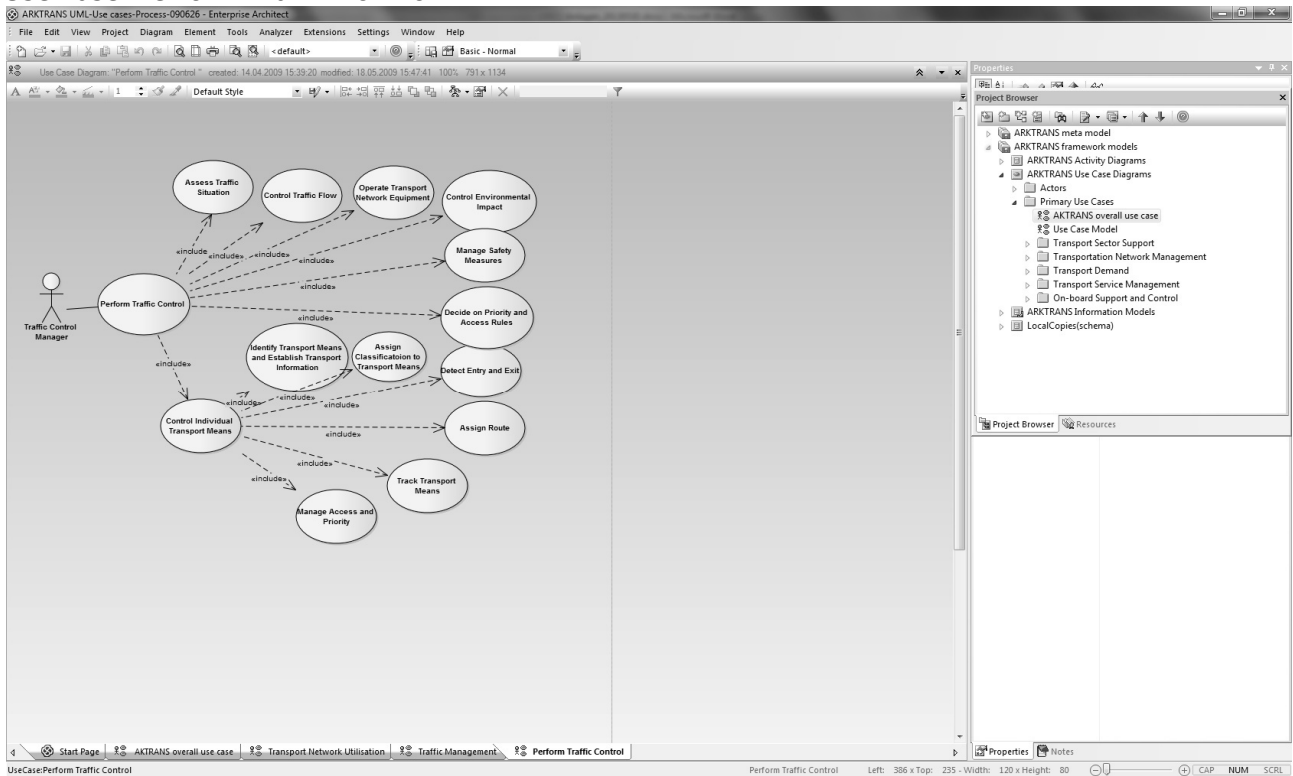


Bild 38: Use Case: Perform Traffic Control

### A2.3.2. Process Viewpoint

## Aktivitätsdiagramm: Manage Transportation Network Resources

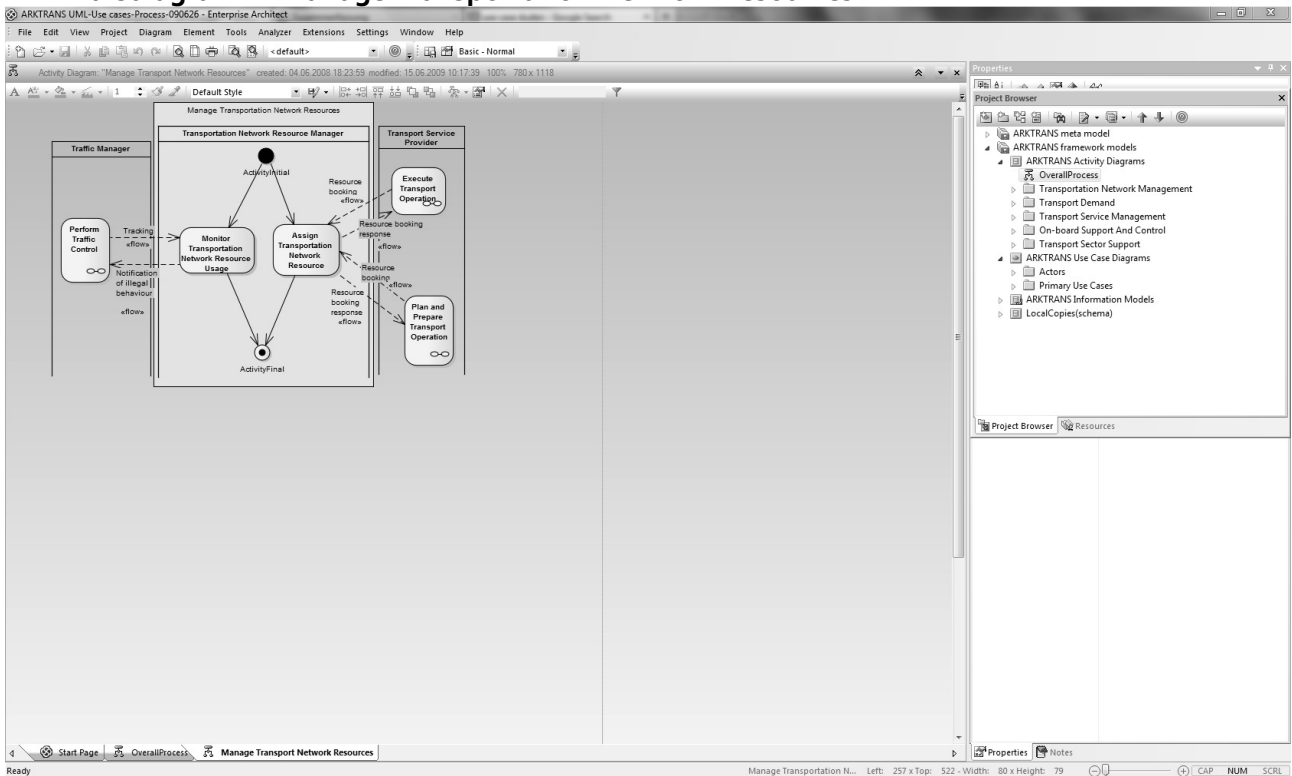


Bild 39: Aktivitätsdiagramm: Manage Transportation Network Resources

## Aktivitätsdiagramm: Perform Operational Traffic Management

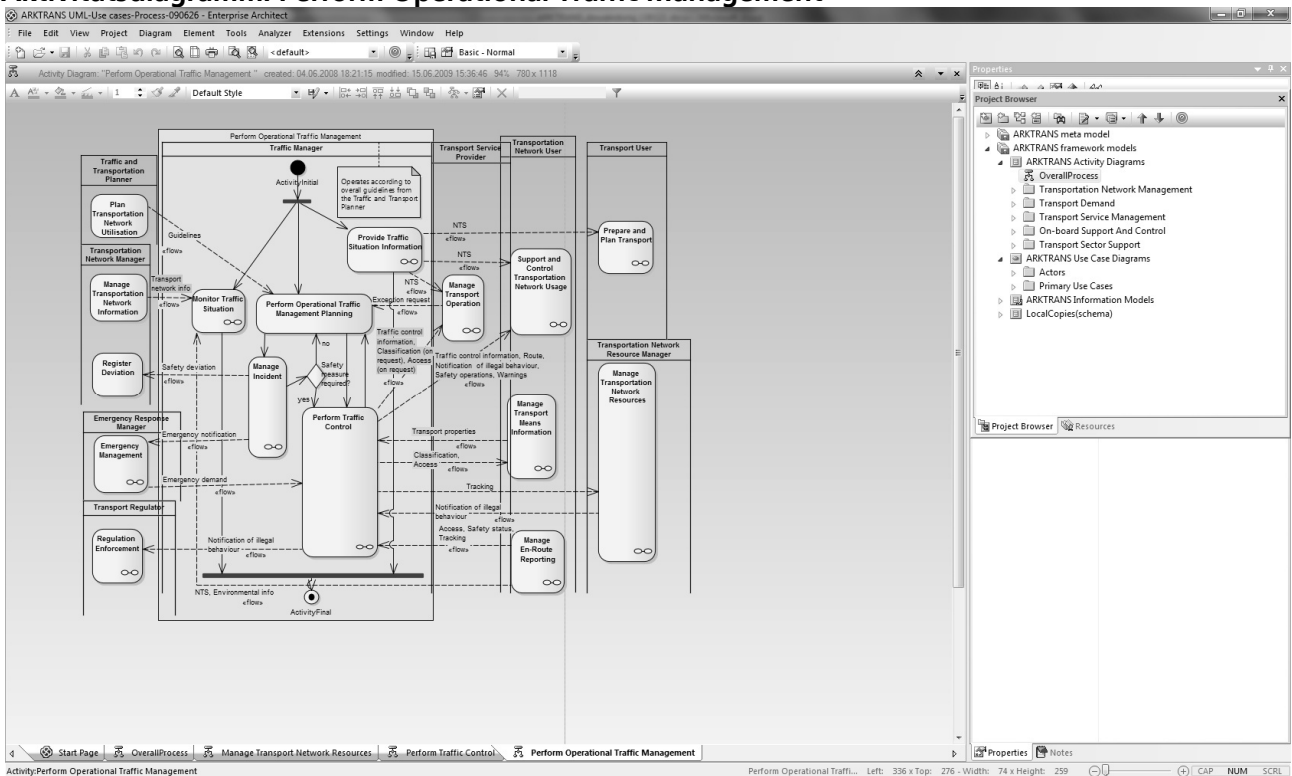


Bild 40: Aktivitätsdiagramm: Perform Operational Traffic Management

## Aktivitätsdiagramm: Monitor Traffic Situation

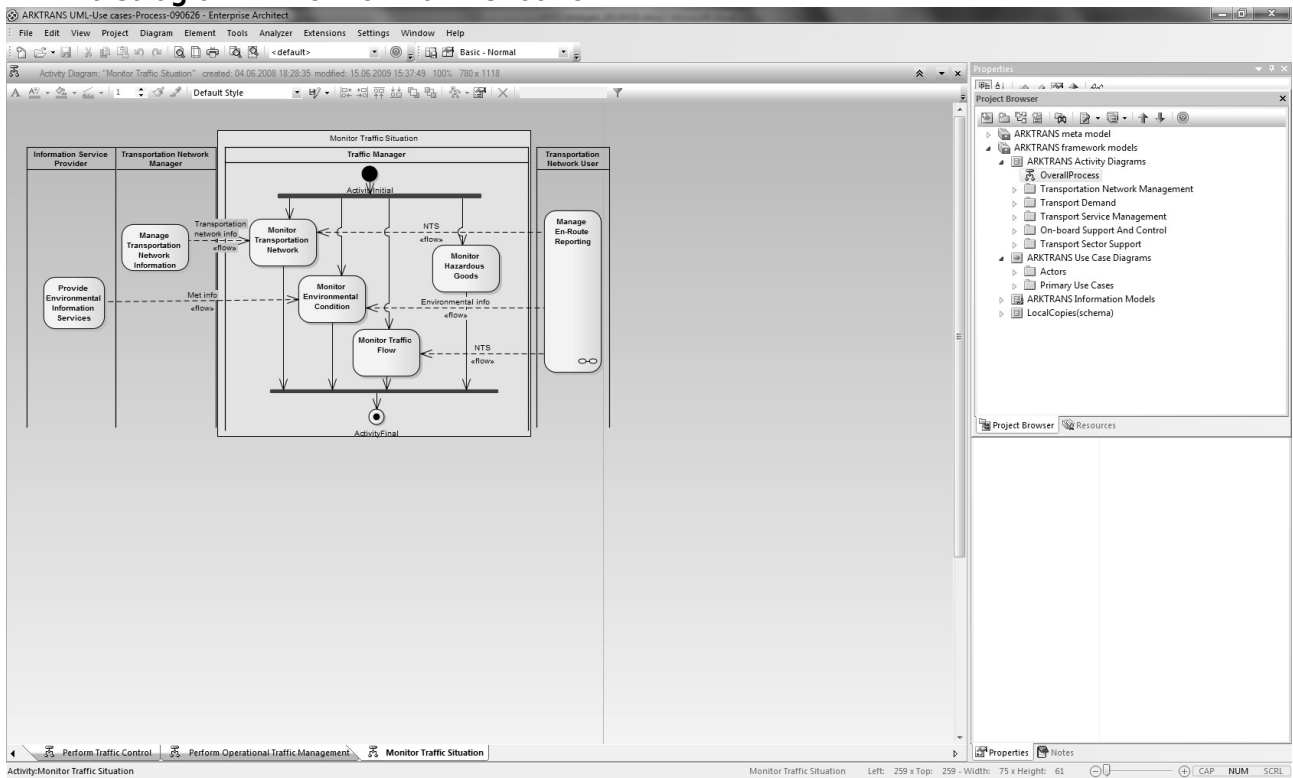


Bild 41: Monitor Traffic Situation

## Aktivitätsdiagramm: Provide Traffic Situation Information

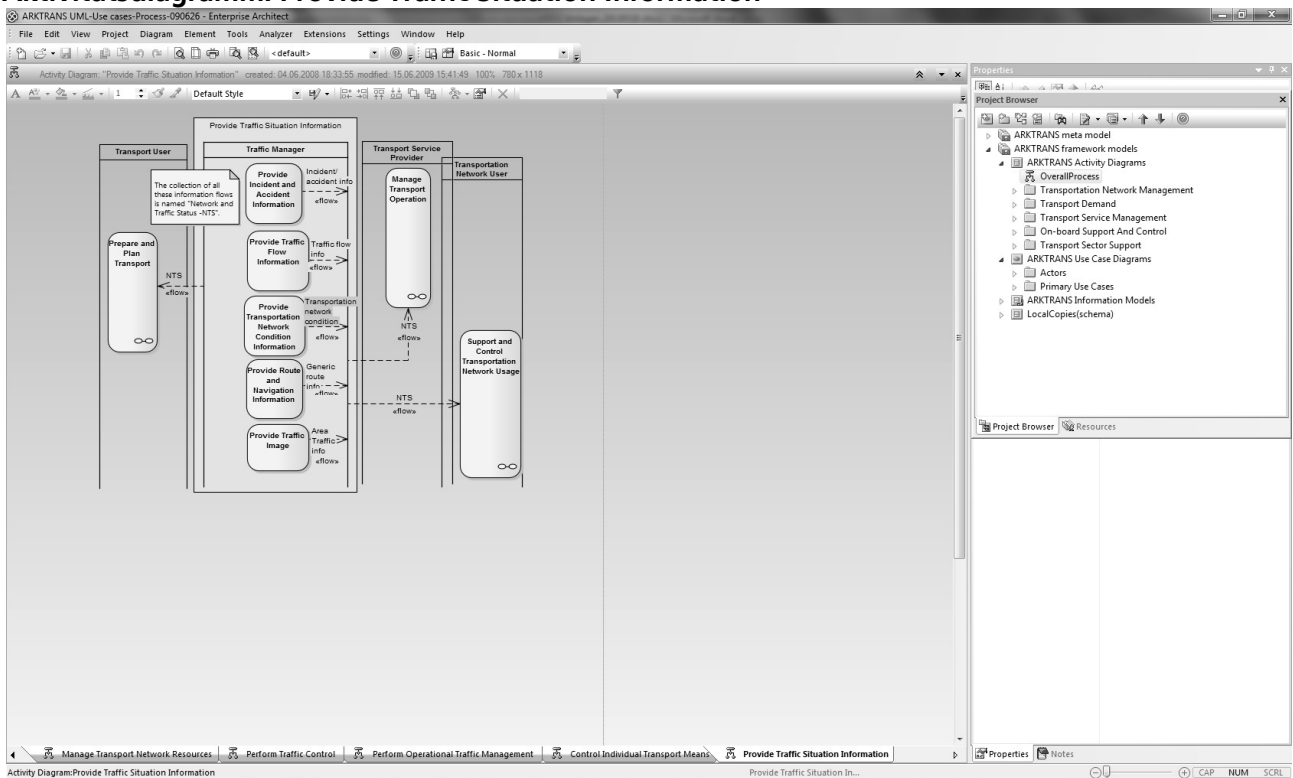


Bild 42: Aktivitätsdiagramm: Provide Traffic Situation Information

## Aktivitätsdiagramm: Perform Traffic Control

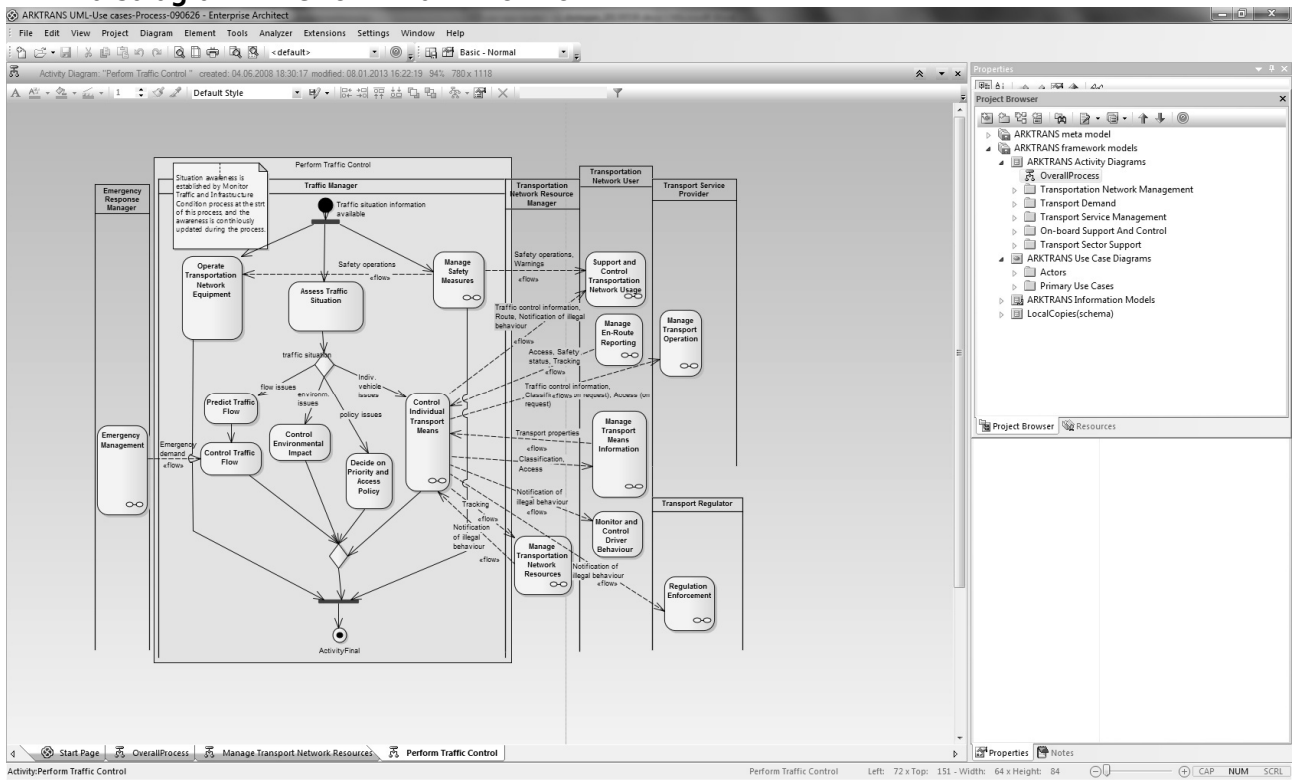


Bild 43: Aktivitätsdiagramm: Perform Traffic Control

### A2.3.3. Information Viewpoint

## Transport Network Resource Information

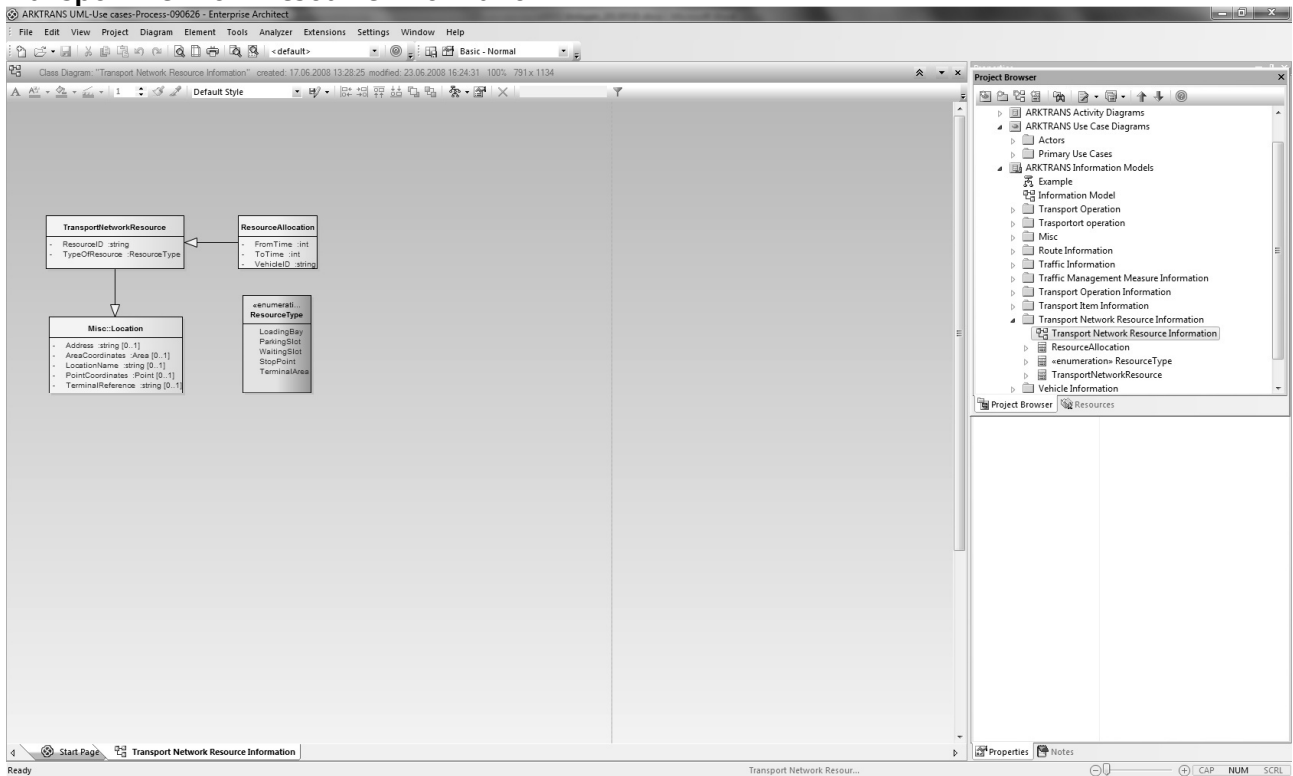


Bild 44: Transport Network Resource Information

## Traffic Information

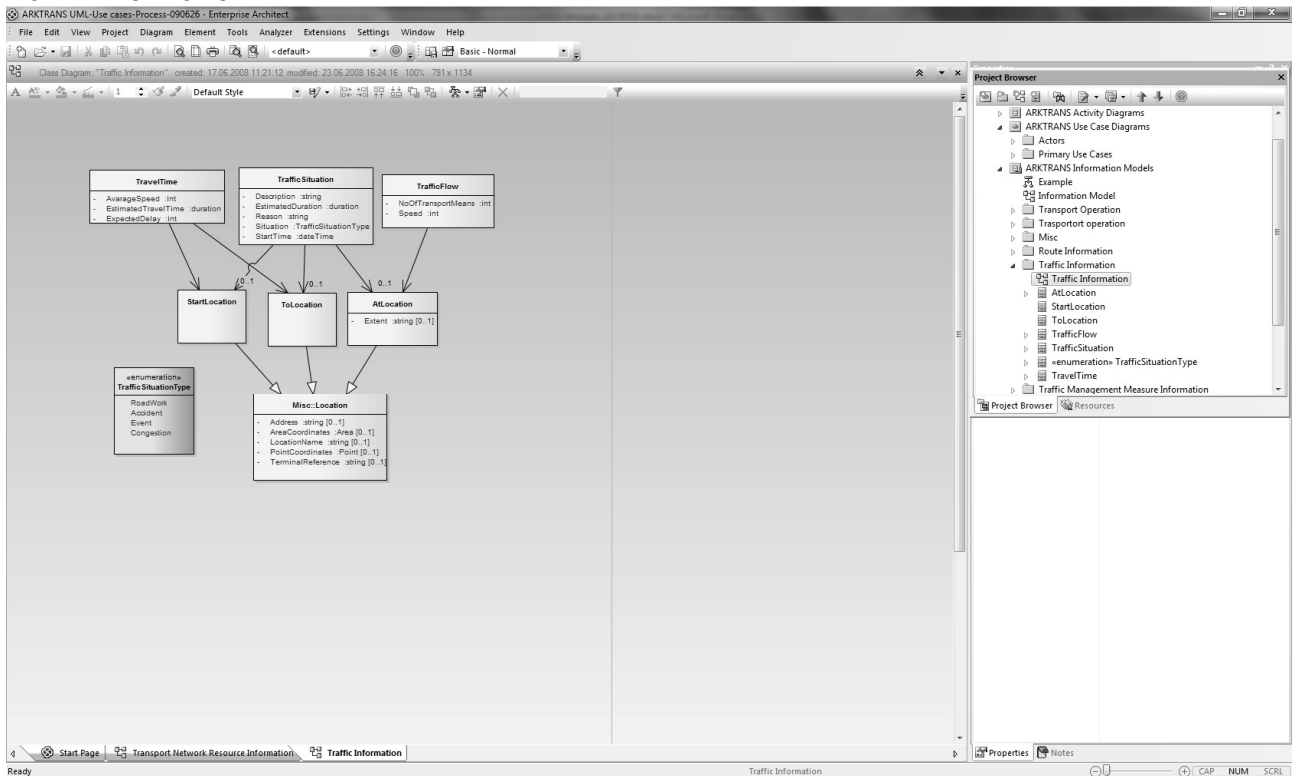


Bild 45: Traffic Information

## Traffic Management Measure Information

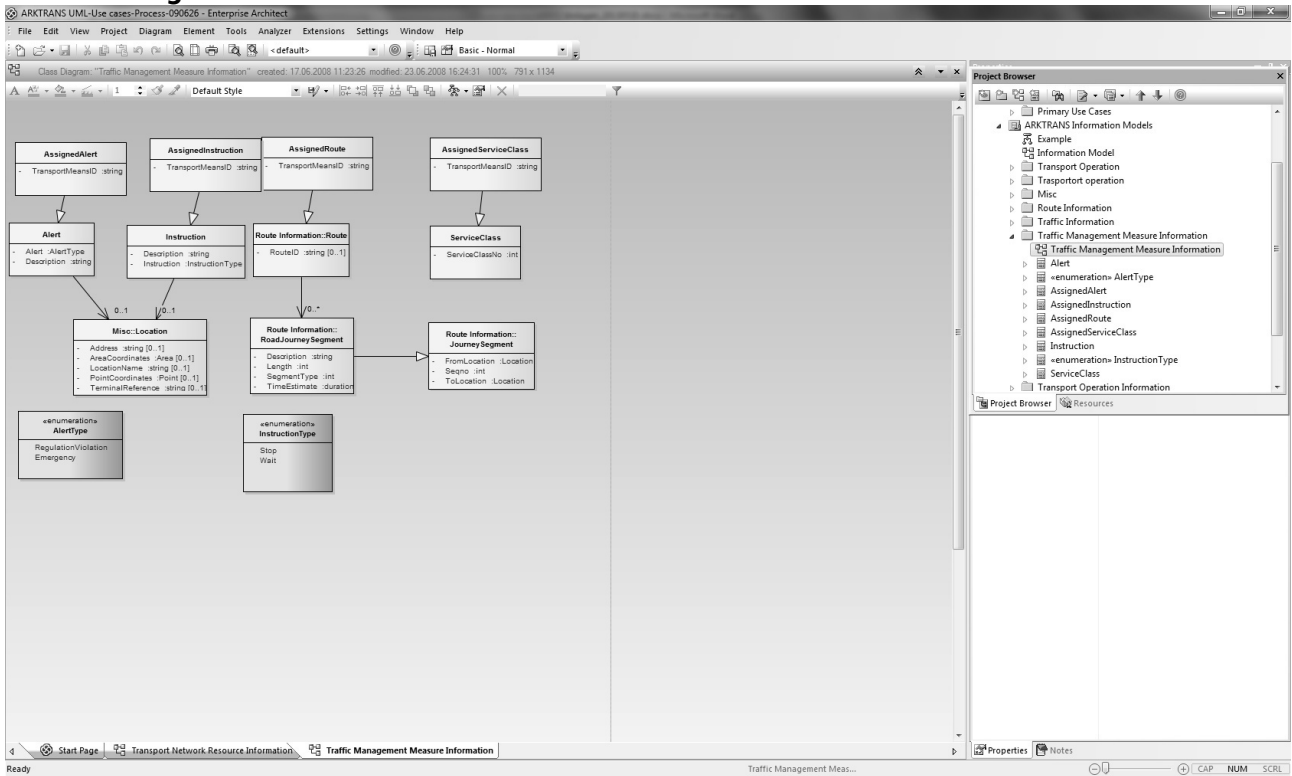


Bild 46: Traffic Management Measure Information

## Transport Operation Information

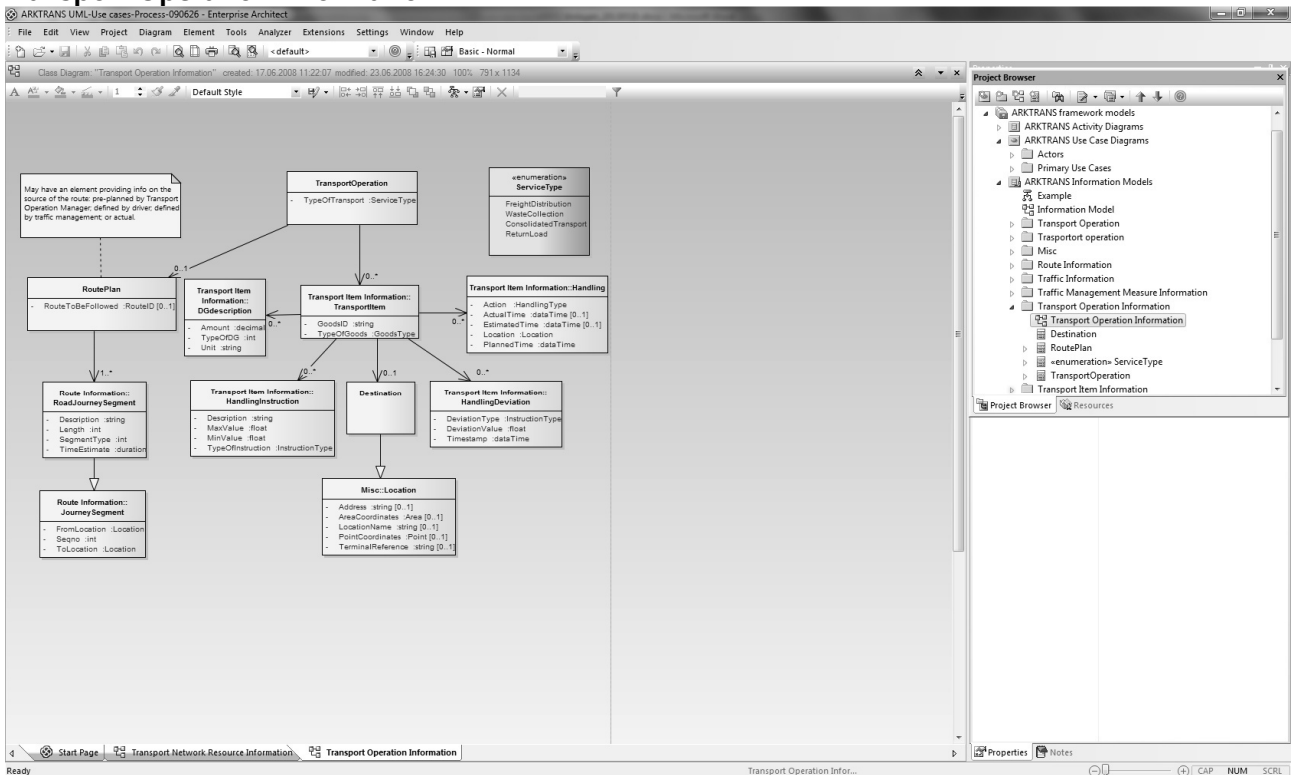


Bild 47: Transport Operation Information



### A3.Methodische Grundlagen, Modellelemente (Ergänzungen)

#### Methodische Grundlagen (Ergänzungen)

ISO 10746-3:1996: Information technology -- Open Distributed Processing -- Reference Model: Architecture.

ISO/TR 26999:2012: Intelligent transport systems - Systems architecture - Use of process-oriented methodology in ITS International Standards and other deliverables.

DIN EN IEC 61508/IEC 61511: Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems (E/E/PE, or E/E/PES).

#### Modellelemente (Ergänzungen):

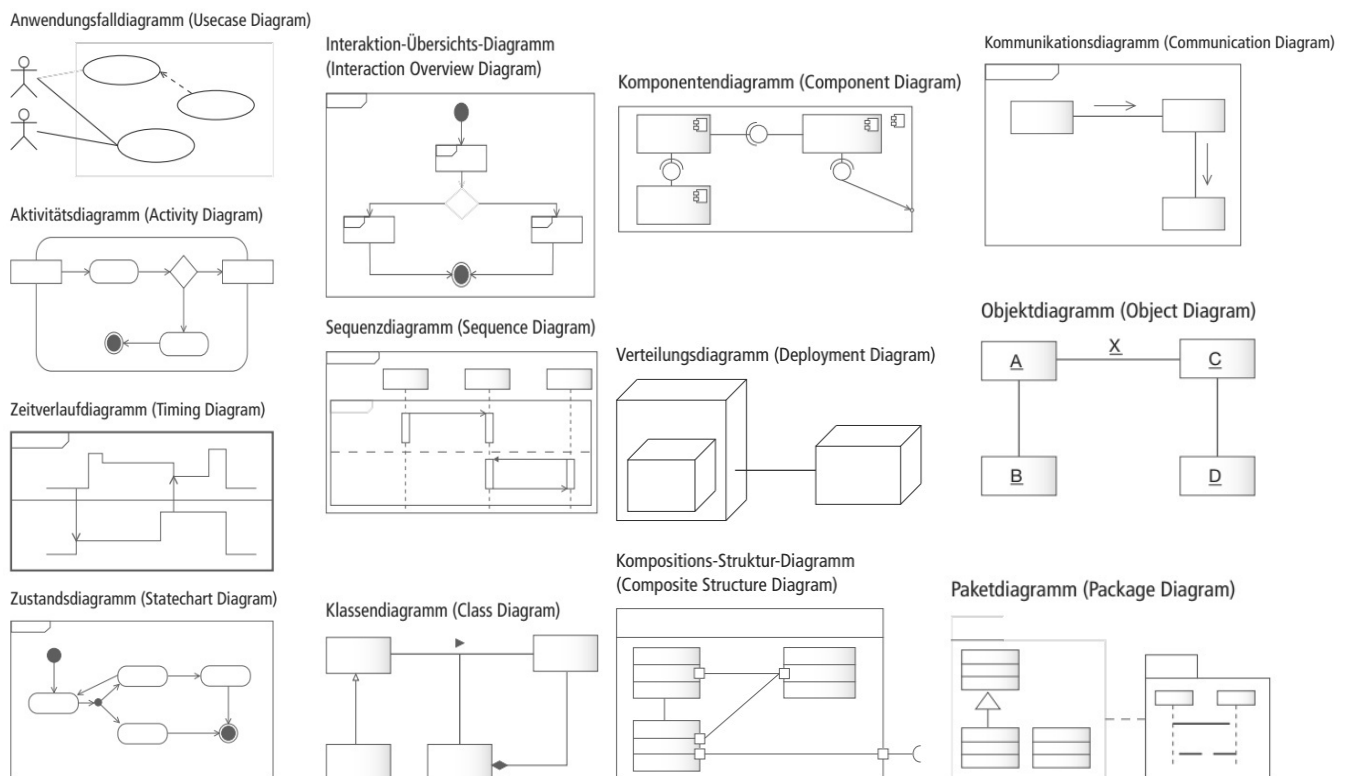


Bild 48: Vollständige Übersicht der UML-Modelle nach Grechenig et al. (2010)

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FRAME (2012): FRAME Selection Tool, Version 3.0.1 Veröffentlicht 2012. Online verfügbar unter: <http://www.frame-online.net/the-architecture/selection-tool.html> (letzter Zugriff am 13.04.2013)

GRECHENIG et al. (2010): Grechenig, T., Bernhart, M., Breiteneder, R., Kappel, K.: Softwaretechnik. Mit Fallbeispielen aus realen Entwicklungsprojekten. Pearson Studium. ISBN 978-3-86894-007-7.

ITERIS (2012): Turbo Architecture Version 7.5.0.2. Online verfügbar unter: <http://www.iteris.com/itsarch/html/turbo/turboform.aspx> (letzter Zugriff am: 13.04.2013)

SINTEF (2009): ARKTRANS UML-Models. The multimodal ITS framework architecture. Version 6. Programmdateien, unveröffentlicht.